UKAS TESTING
2082N

EMISSION MONITORING OF THE 4 No. CREMATORS AT COVENTRY CREMATORIUM

AT COVENTRY CREMATORIUM

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EXECUTIVE SUMMARY

Resource & Environmental Consultants (REC) Ltd was commissioned by Coventry Crematorium to monitor emissions of pollutants from 4 x No. Cremators at their site in Coventry.

In accordance with the requirements of their site authorisation, monitoring has been undertaken for the following:-

- Total Particulate Matter
- Hydrogen Chloride (HCl)
- Total Volatile Organic Compounds (VOCs) expressed as Carbon (C)
- Combustion Gases including O_2 and CO

The following results were obtained from the emission monitoring survey and are compared with the current authorisation limit:-

Species	Accreditation Status	Average Emission Concentration (mg/Nm^3 @ 11% O_2)	PG 5/2 (04) Limit
		Cremator 1	(mg/Nm^3)
Volatile Organic Compounds	A	2	20
Carbon Monoxide	A	<1	100
Particulate Matter	A	113	80/160[3]
Hydrogen Chloride	B	71.8	200

Species	Accreditation Status	Average Emission Concentration (mg/Nm^3 @ 11% O_2)	PG 5/2 (04) Limit
		Cremator 2	(mg/Nm^3)
Volatile Organic Compounds	A	2	20
Carbon Monoxide	A	2	100
Particulate Matter	A	71	80/160[3]
Hydrogen Chloride	B	23.7	200

Species	Accreditation Status	Average Emission Concentration (mg/Nm^3 @ 11% O_2)	PG 5/2 (04) Limit
		Cremator 3	(mg/Nm^3)
Volatile Organic Compounds	A	<1	20
Carbon Monoxide	A	<1	100
Particulate Matter	A	96	80/160[3]
Hydrogen Chloride	B	76.2	200

Species	Accreditation Status	Average Emission Concentration (mg/Nm^3 @ 11% O_2)	PG 5/2 (04) Limit
		Cremator 4	(mg/Nm^3)
Volatile Organic Compounds	A	2	20
Carbon Monoxide	A	<1	100
Particulate Matter	A	67	80/160[3]
Hydrogen Chloride	B	32.1	200

NOTE 1: All data are expressed in mg/Nm^3 and are expressed at 273K, 101.3kPa, dry gas 11% oxygen unless otherwise stated.

NOTE 2: UKAS/MCERTS status:- (A) REC Ltd accredited for sampling and analysis. (B) REC Ltd accredited for sampling only, UKAS accredited analysis conducted by SAL Ltd. (C) REC Ltd not accredited for sampling, UKAS accredited analysis conducted by SAL Ltd. (D) REC Ltd not accredited for sampling, analysis not UKAS accredited.

NOTE 3: PG 5/2 (04) gives a second limit of 160 averaged over an hour for all cremations. Run 3 on cremator 2 exceeded the limit of 80 mg/Nm^3, but when averaged over an hour it is less than 160 mg/Nm^3.

1. INTRODUCTION

1.1 Background

Coventry Crematorium commissioned REC Ltd to conduct an emissions monitoring survey on 4 x No. Cremators, at their site in Coventry.

Cremations at the Coventry Crematorium are carried out using 4 x gas fired cremators.

1.2 Scope of the Survey

An emission monitoring survey was required to determine the release concentrations of various pollutants from the 4 x No. Cremators. The following were quantified during the survey.

- Total Particulate Matter
- Hydrogen Chloride (HCl)
- Total Volatile Organic Compounds (VOCs) expressed as Carbon (C).
- Combustion Gases including O_2, CO, NO_x, and SO_2

Ancillary measurements of stack dimensions, temperature and velocity were also made.

Sampling for combustion gases and VOCs was carried out on a continuous basis with measured concentrations being data-logged at 1 minute intervals over the sampling period. All other pollutants were sampled in triplicate.

All results were to be reported at 273K, 101.3kPa, dry gas, corrected to an oxygen content of 11%.

1.3 Sampling Personnel

Monitoring was conducted by the following REC Ltd permanent staff:-

- David Burns - MCERTS Level 1
- Michelle Edwards - MCERTS Trainee

2. METHODOLOGY

2.1 Species and Techniques

The following table shows the reference methods used for the emissions monitoring survey:

Species	Accreditation Status	Method	Uncertainty± %	Limit of Detection
Moisture	A	In house method MM0010 based on US EPA Method 4.	20	0.1%
Particulate Matter	A	In house method MM0009 based on ISO 9096	10	2
Hydrogen Chloride	B	In house method MM0006 based on BS EN 1911	20	1
Carbon Monoxide	A	In house method MM0002 based on ISO 12039	10	1
Oxygen	A	In house method MM0002 based on ISO 12039	10	0.1%
Volatile Organic Compounds	A	In house method MM0002 based on BS EN 12619 & 13256	10	1

NOTE: UKAS/MCERTS status:- (A) REC Ltd accredited for sampling and analysis. (B) REC Ltd accredited for sampling only, UKAS accredited analysis conducted by SAL Ltd. (C) REC Ltd not accredited for sampling, UKAS accredited analysis conducted by SAL Ltd. (D) REC Ltd not accredited for sampling, analysis not UKAS accredited.

2.2 Sampling & Analytical Methodology

Total Particulate Matter

To determine the concentration of particulate matter in the emissions, isokinetic stack sampling equipment satisfying the ISO 9096. In house method MM0009 was followed.

The Standard describes the methodology for measuring particulate matter under defined conditions and at discrete locations in the duct. Sampling is carried out under isokinetic sampling conditions i.e. the flowrate through the sampling nozzle is adjusted to equal the flowrate in the duct at the sampling positions. Velocity pressures were recorded throughout the monitoring period by means of an 'S' type pitot integral to the sampling probe and nozzle assembly.

A sample of the exhaust stream was removed from the stack via an inconel nozzle and inconel lined heated probe. It was then passed through a quartz fibre filter contained in a heated oven compartment. The temperature of the probe and filter box were maintained at 160°C i.e. above the dew point of the stack gases, to ensure moisture did not condense on the filter.

The impinger train was seated in a water bath to cool the gas stream and condense out less volatile gases and water vapour.

The first three impingers encountered by the gas stream contained deionised water. The fourth impinger was left empty and the fifth contained anhydrous silica gel which was used to dry the gas stream before passing it through a dry gas meter (DGM) to measure the volume of gas sampled.

All the impingers were weighed before and after the sampling run in order to determine the mass of water condensed by the impinger train (in house Method MM00010).

Upon completion of sampling, the filter was removed to a clean petri dish, labelled and sealed. The probe and filter housing were rinsed with acetone and water. The washings were collected in a container and submitted for analysis along with the filter.

HCl

To determine the concentration of HCl in the emissions, isokinetic stack sampling equipment satisfying the requirements of BS EN 1911. In house method MM0006 was followed.

A sample of the exhaust stream was removed from the stack via an inconel nozzle and inconel lined heated probe. It was then passed through a quartz fibre filter contained in a heated oven compartment. The temperature of the probe and filter box were maintained above 160°C in accordance with MM0006. On leaving the filter, the sampled exhaust gas was passed into a series of impingers. The first three impingers encountered by the gas stream contained deionised water to capture and absorb the volatile chloride (Cl^-). The fourth impinger was left empty and the fifth contained anhydrous silica gel which was used to dry the gas stream before passing it through a dry gas meter (DGM) to measure the volume of gas sampled.

Upon completion of sampling, the contents of the first three impingers were transferred to a sealed, labelled container, which was subsequently analysed for Cl^- via an ion chromatographic technique.

Combustion Gases

To determine the concentration of combustion gases (CO, and O_2) in emissions, a Testoterm Model 350XL multigas analyser was used. The analyser incorporates a gas conditioner to enable the gas stream to be presented to the electrochemical cells on a dry gas basis. In house method MM0002 was followed.

The analyser satisfies the requirements of the following Standards:-

CO & O_2	-	ISO 12039

For each parameter the measured value (m.v.) and accuracy associated with this type of measurement using the Testo 350XL is:

O_2	±	0.8% of full scale deflection
CO	±	2ppm (0-39.9ppm), ± 5% of m.v. (40 - 500ppm).

The analyser would be calibrated against traceable test gases prior to the survey.

The Standards describe the methodology for measuring the combustion gases listed above under defined conditions in the duct. Sampling is carried out under anisokinetic sampling conditions as it is assumed that the gas is homogenous across the sample plane.

Total VOCs

To determine the concentration of VOCs in emissions, a Signal 3030 portable flame ionisation detector (FID) was employed. The analyser consists of a sintered filter, to remove particulate matter, a heated sampling line and heated FID block. This equipment satisfies the requirements of US EPA Method 25A and BS ENs 13526 and 12619 (in house method MM0002).

The instrument is calibrated over a number of ranges against a traceable methane (CH_4) or propane (C_3H_8) standard prior to and on completion of each test.

VOCs are detected by the FID with the output being proportional to the number of carbon atoms present in the sample. The readout displays a VOC figure expressed in ppm as carbon which is converted to mg/Nm^3 as carbon.

Stack Temperature and Velocity

To determine the stack temperature, a calibrated thermocouple and digital indicator were employed. The exhaust gas velocity was investigated using a pitot static probe (to MM0009) and incline manometer.

3. SAMPLING AND OPERATIONAL DETAILS

3.1 Process Description

The operation of the process at Coventry Crematorium is classified as a Part B process under the Prescribed Process and Substances Regulations. The process is therefore under Local Authority regulation and must demonstrate compliance with the standards published.

The following Guidance Note applies:- PG Note 5/2 (04) Secretary of State's Guidance for Crematoria.

The process is a batch process with each batch lasting between 1 and 2 hours (depending on the size of the body). Each sample run lasts for one burn. The cremators are gas fired.

In accordance with the above Guidance Note sampling lasts for one complete cremation, commencing as soon as stable conditions are achieved inside the cremator, at least two minutes after the coffin is charged and ceasing just before the operator rakes down the cremator.

3.2 Sampling Positions

On each stack, 2 x 4" BSP sampling ports were installed at 90^0 to each other, in the same horizontal plane. The sampling points provided were more than 5 x hydraulic diameters from any flow disturbance both upstream and downstream from the sampling plane.

3.3 Uncertainty

As the method was followed correctly, the accuracies detailed above will apply.

3.4 Emissions Monitoring Survey Details

The emissions monitoring survey was carried out on the 4 x No. cremators between 4^{th} and 7^{th} October 2005. Table 3.1 (below) summarises the actual sampling periods.

TABLE 3.1

Cremator, Test Ref.	Test Time/Date	Test Duration (mins)	Coffin Size
Cremator 1, Test 1	10:25 - 11:25 (06/10/05)	60	Medium
Cremator 1, Test 2	12:40 - 13:40 (06/10/05)	60	Medium
Cremator 1, Test 3	14:20 – 15:20 (06/10/05)	60	Medium
Cremator 2, Test 1	11:00 – 12:00 (05/10/05)	60	Medium
Cremator 2, Test 2	13:00 – 14:00 (05/10/05)	60	Medium
Cremator 2, Test 3	15:10 – 16:10 (05/10/05)	60	Medium
Cremator 3, Test 1	09:05 – 10:05 (07/10/05)	60	Medium
Cremator 3, Test 2	11:27 – 12:27 (07/10/05)	60	Medium
Cremator 3, Test 3	13:07 – 14:07 (07/10/05)	60	Large
Cremator 4, Test 1	09:41 – 10:41 (04/10/05)	60	Medium
Cremator 4, Test 2	12:01 – 13:01 (04/10/05)	60	Medium
Cremator 4, Test 3	13:50 – 14:50 (04/10/05)	60	Medium

4. RESULTS AND DISCUSSION

4.1 Particulate Matter

The results of the particulate sampling runs are summarised in Tables 2, 8, 14 & 20. From the mass of particulate matter on the filter and in the acetone/water wash residue and volume sampled an emission concentration was calculated.

The results are expressed in mg/m^3 at 273K, 101.3kPa, on a dry gas basis at measured and 11% O_2 content.

4.2 Hydrogen Chloride

The results of the volatile chloride and fluoride sampling runs are summarised in Tables 3, 9, 15 & 21. From the concentration of Cl^- and the measured volume of absorbing solution a total mass of HCl in microgram (μg) was determined. From the molecular weight, the equivalent weight of HCl was then calculated. From the measured sample volume, an emission concentration was calculated.

The results are expressed in mg/m^3 at 273K, 101.3kPa, on a dry gas basis at measured and 11% O_2 content.

4.3 Combustion Gases

The results of the combustion gas monitoring tests are summarised in Tables 4-6, 10-12, 16-18 & 22-24 and are also graphed in Figures 1 to 12. The tables present the average of the sample periods.

Concentrations are expressed in mg/m^3 at the standard reference conditions of 273K, 101.3kPa without correction for water vapour at 11% oxygen content.

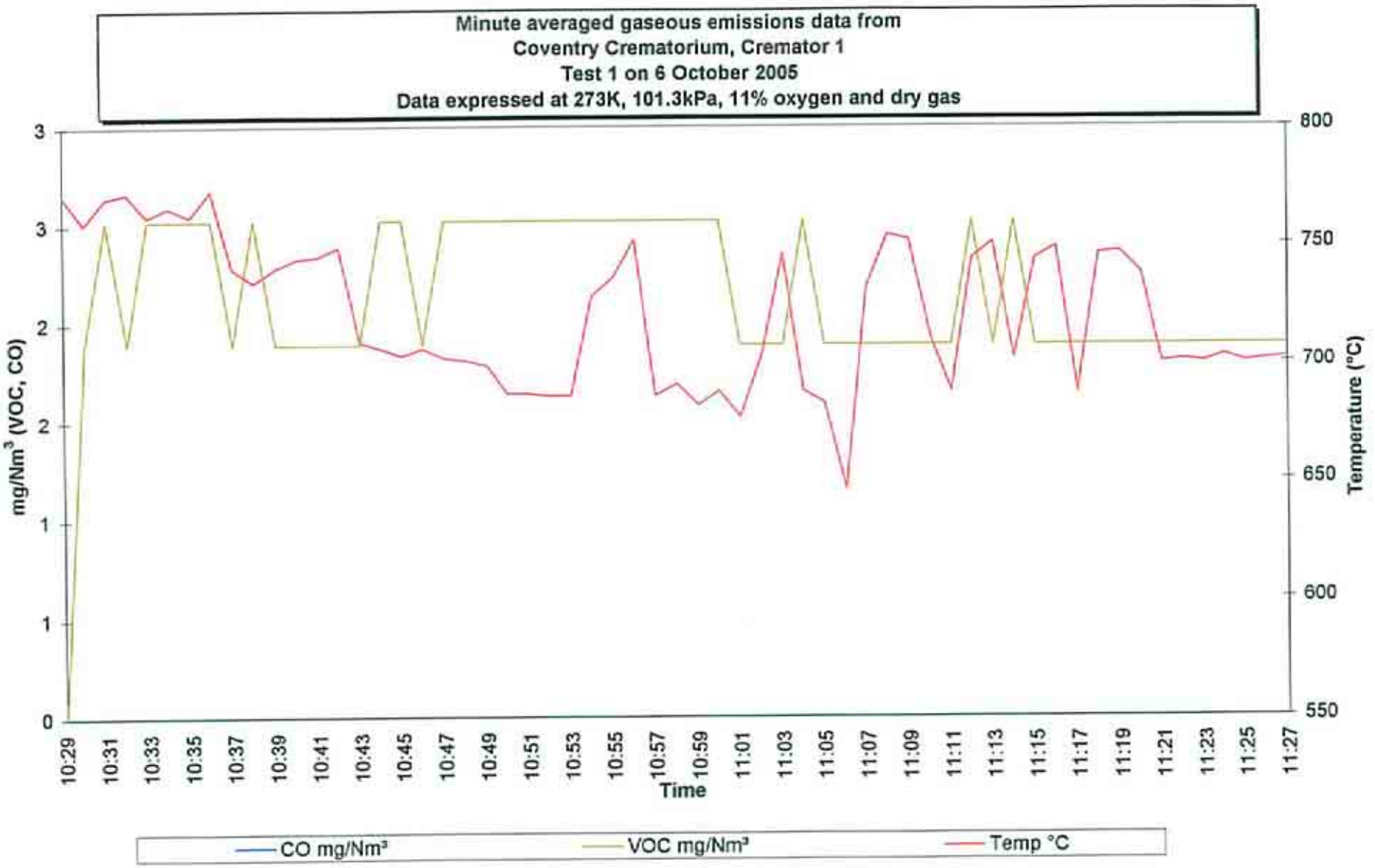
4.4 Total VOC Emission Data

The results of the VOC monitoring tests are summarised in Tables 4-6, 10-12, 16-18 & 22-24 and are also graphed in Figures 1 to 12. The tables present the average of the sample periods.

Concentrations are expressed in mg/m^3 as carbon at the standard reference conditions of 273K, 101.3kPa without correction for water vapour at 11% oxygen content.

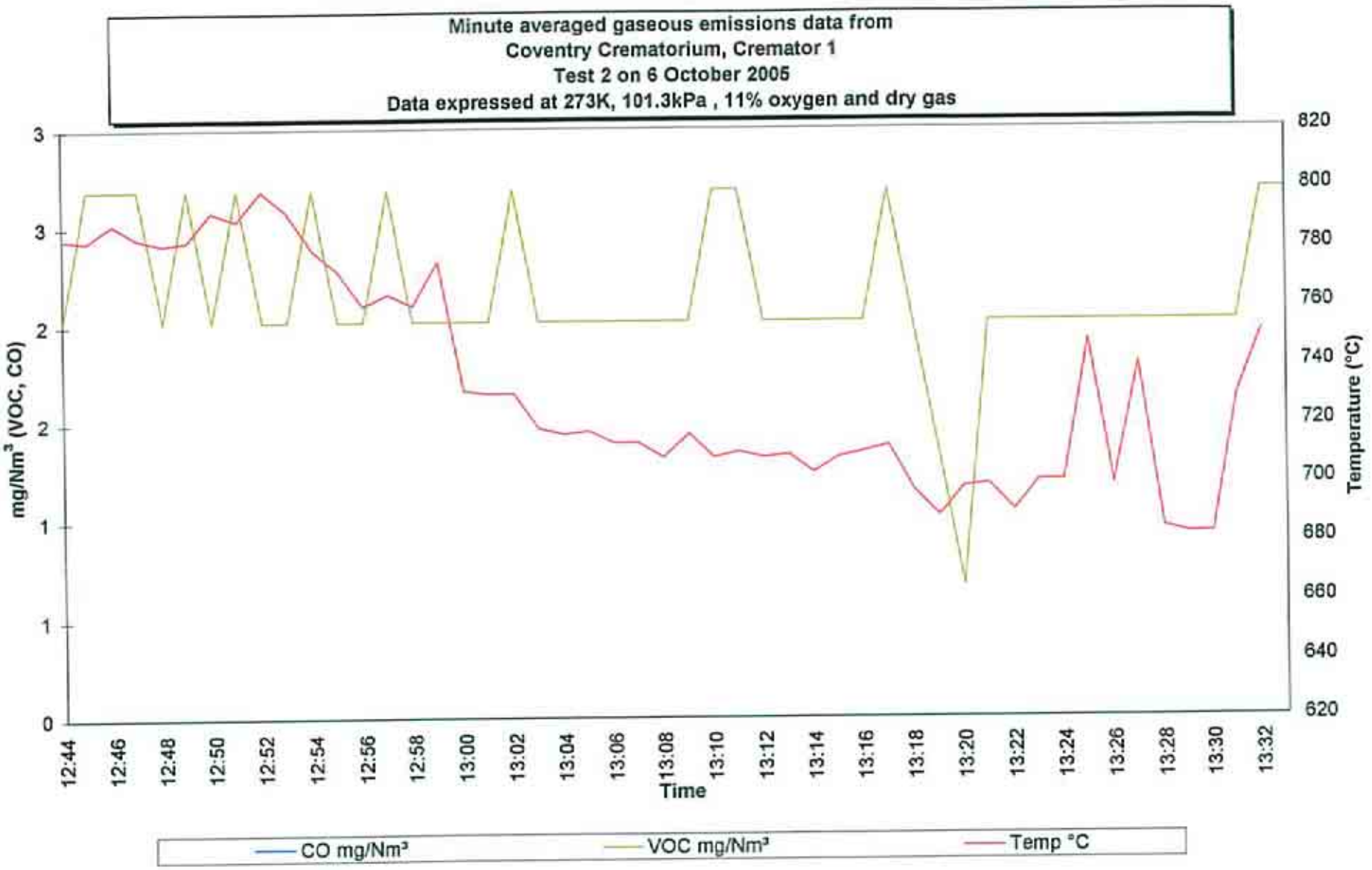
----------End of Report Text---------

FIGURES



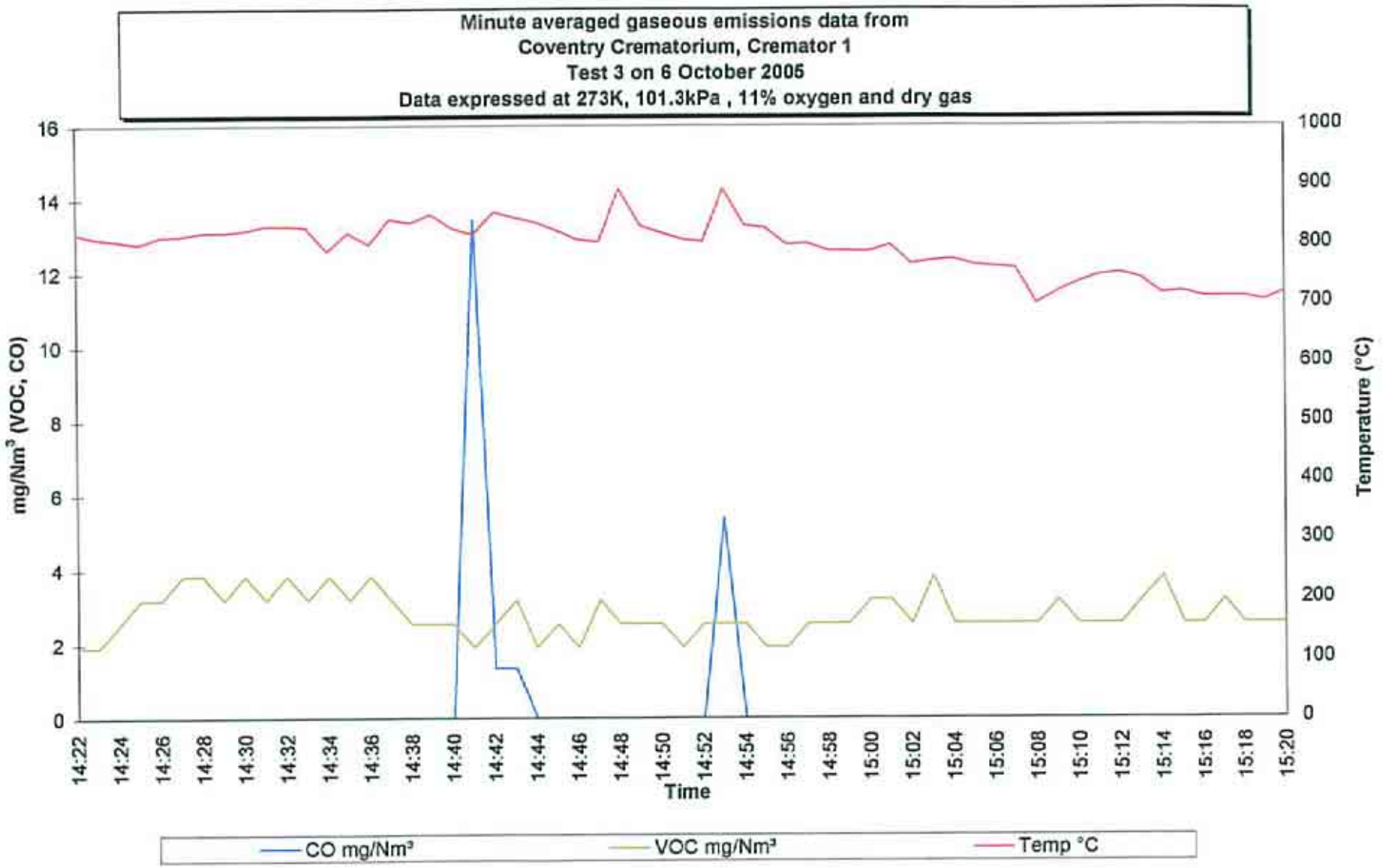
crem 1 tests 1-3 cem CREM 1 TEST 1 PIC

Figure 1



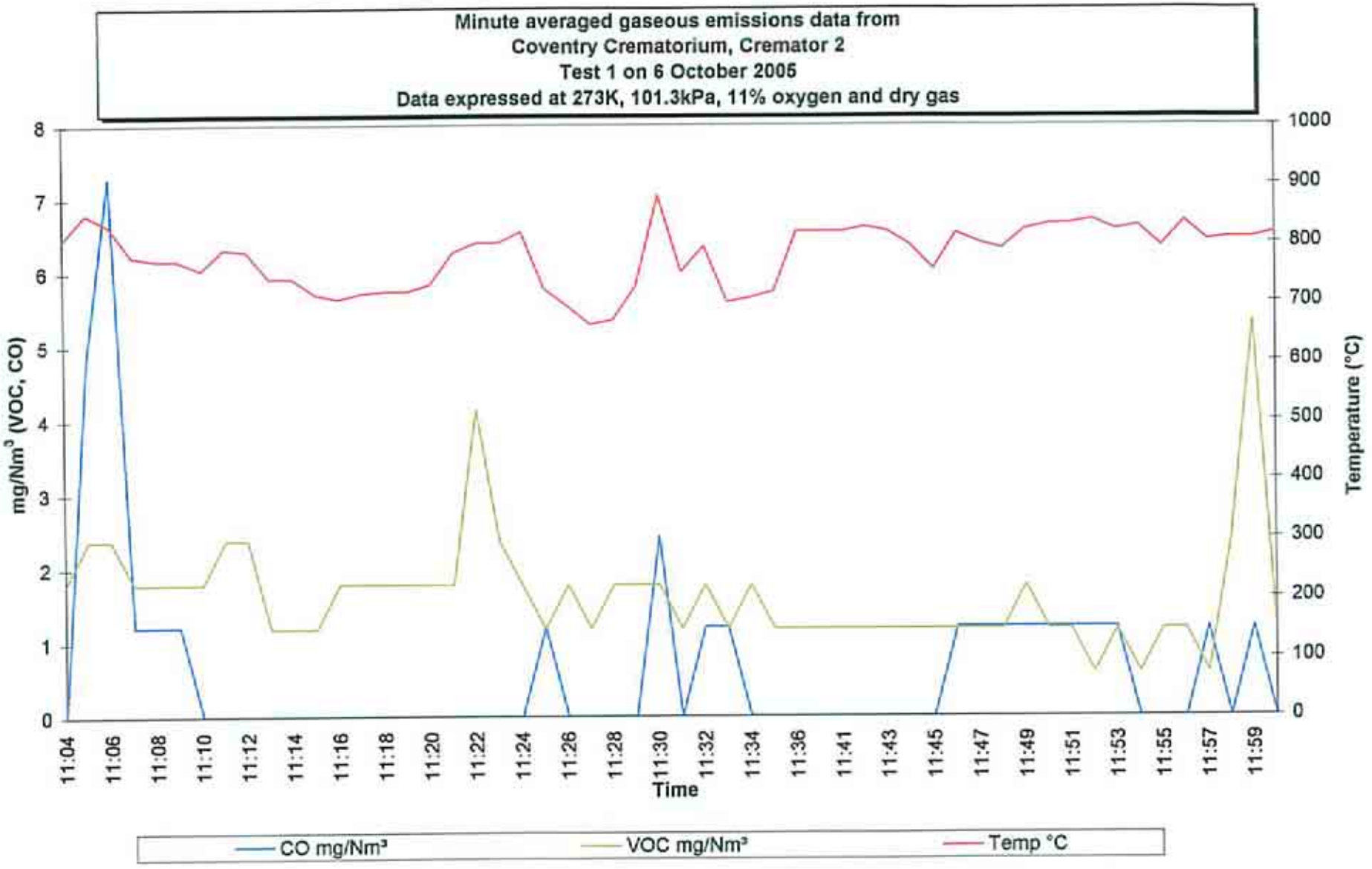
crem 1 tests 1-3 cem CREM 1 TEST 2 PIC

Figure 2



crem 1 tests 1-3 cem CREM 1 TEST 3 PIC

Figure 3


Minute averaged gaseous emissions data from
Coventry Crematorium, Cremator 2
Test 1 on 6 October 2005
Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas
mg/Nm³ (VOC, CO)
Temperature (°C)
Time
0
1
2
3
4
5
6
7
8
0
100
200
300
400
500
600
700
800
900
1000
11:04
11:06
11:08
11:10
11:12
11:14
11:16
11:18
11:20
11:22
11:24
11:26
11:28
11:30
11:32
11:34
11:36
11:41
11:43
11:45
11:47
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11:53
11:55
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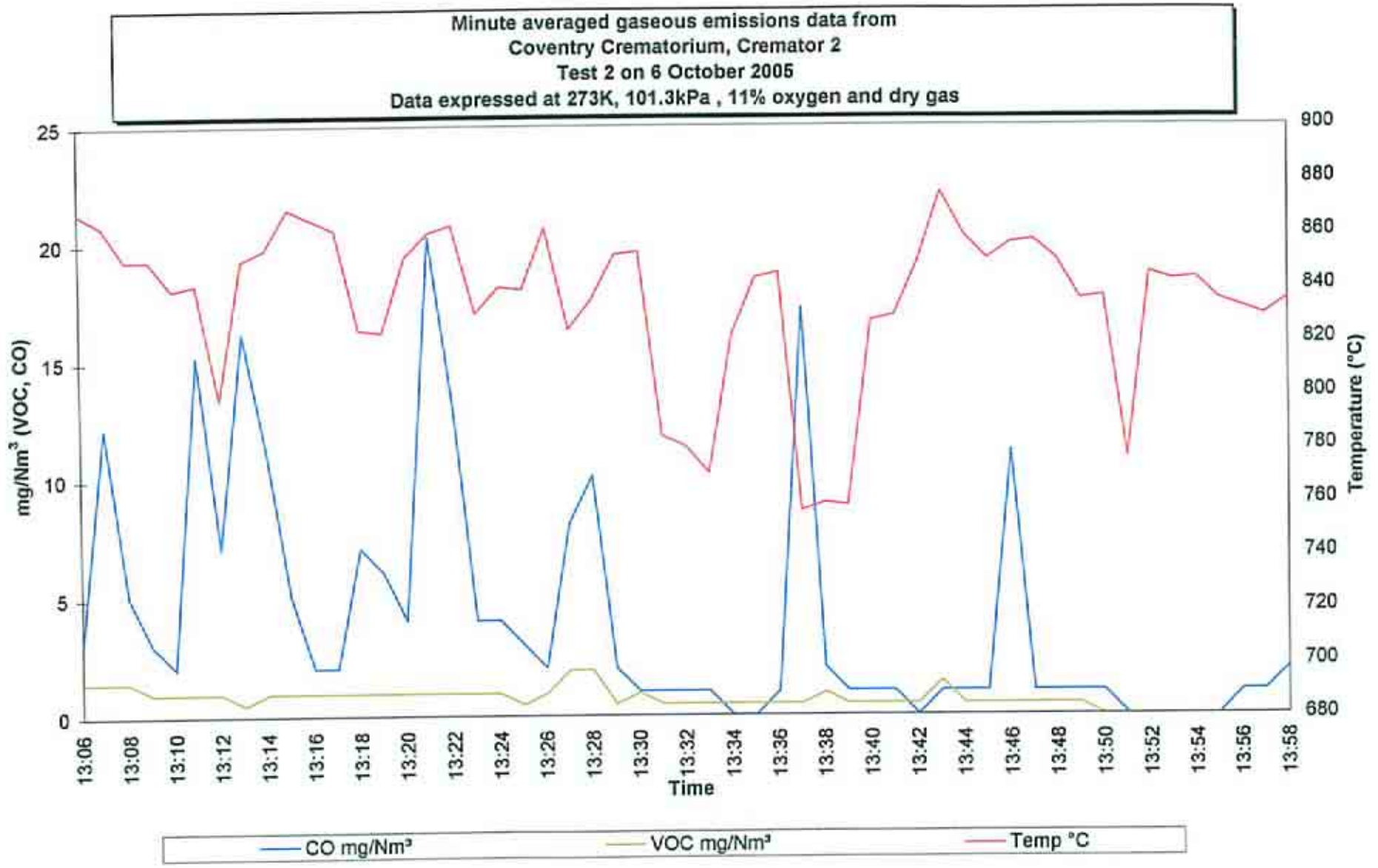
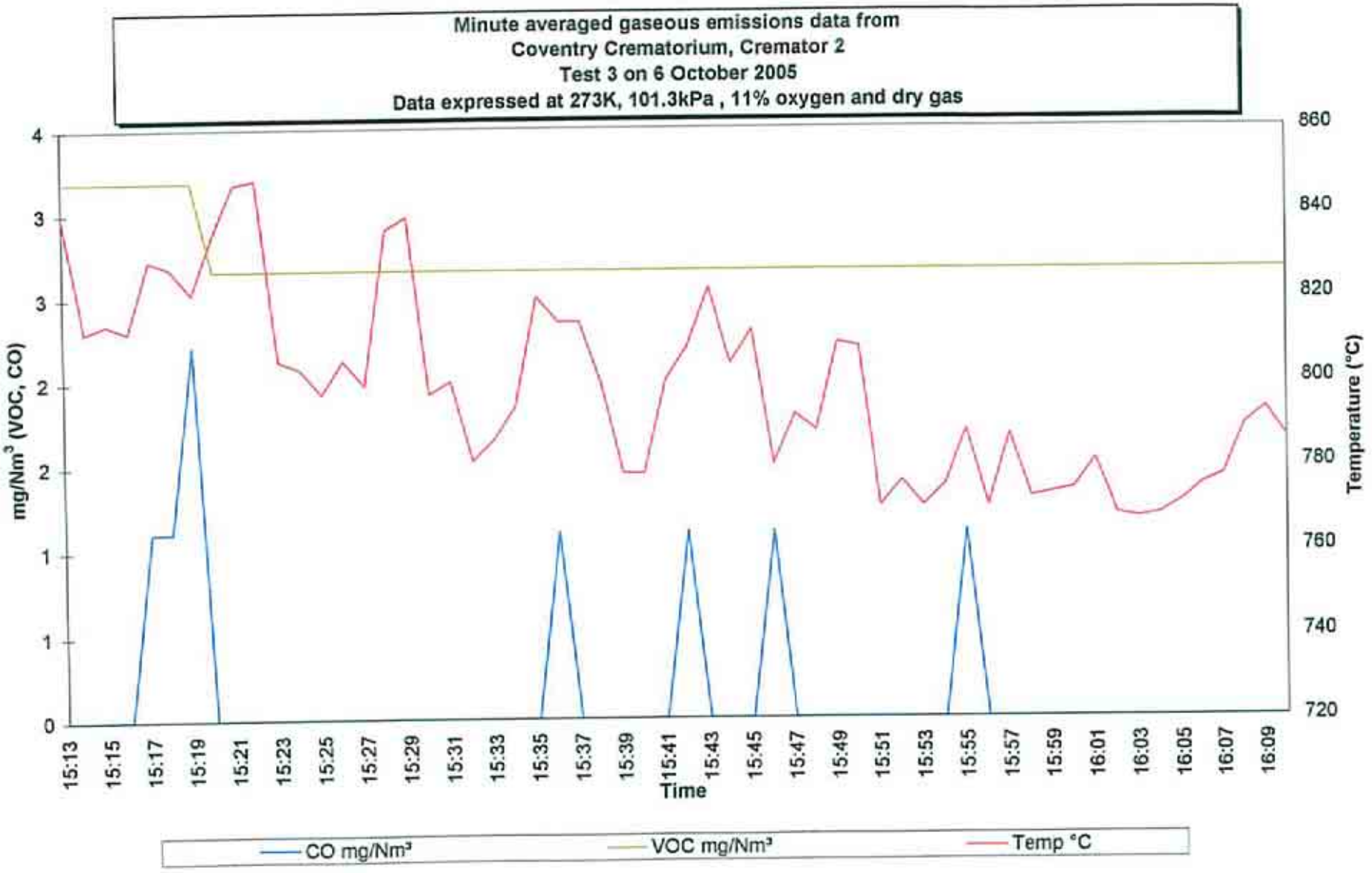
11:59
CO mg/Nm³
VOC mg/Nm³
Temp °C

Figure 4



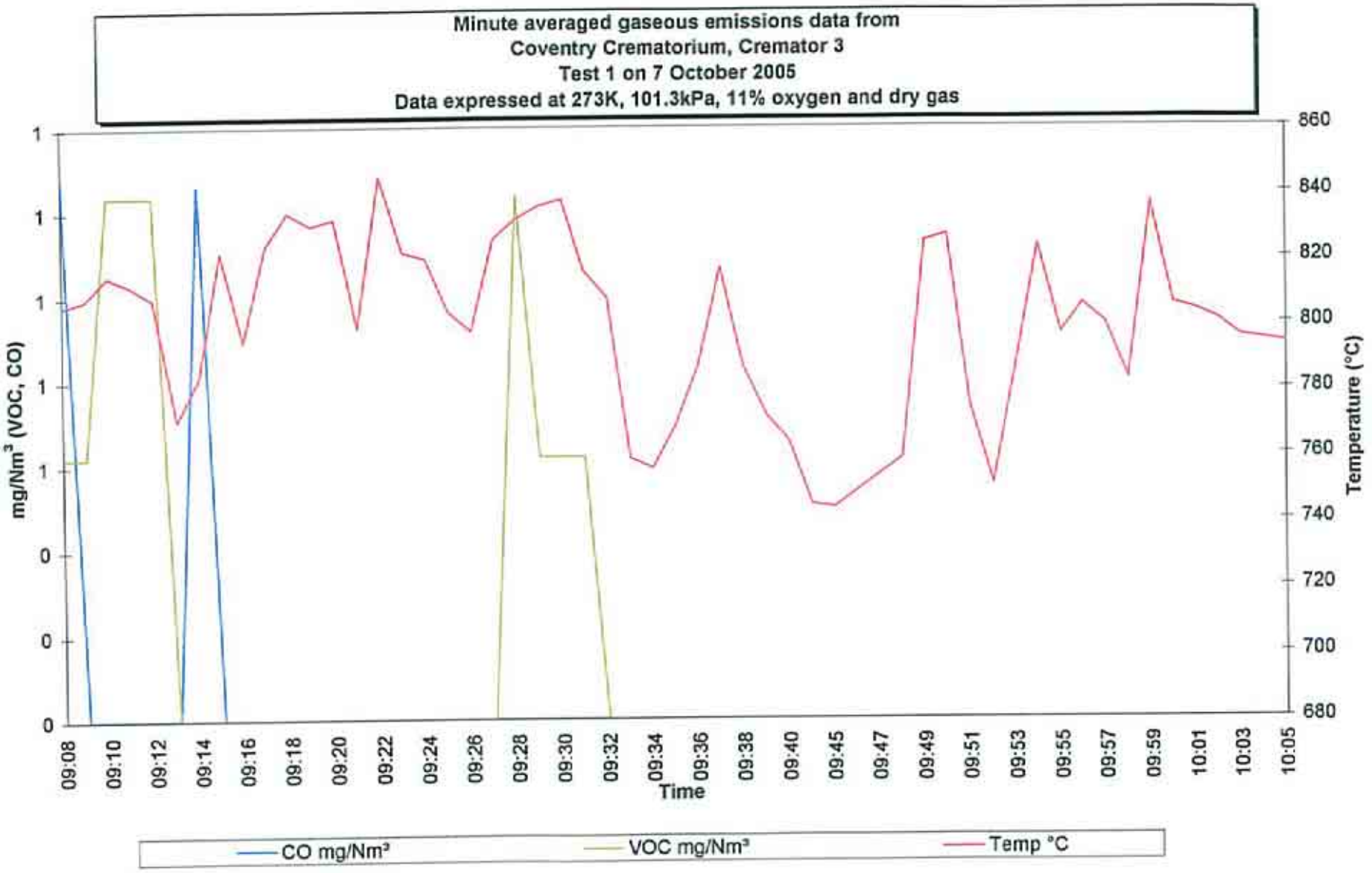
crem 2 tests 1-3 cem CREM 2 TEST 2 PIC

Figure 5



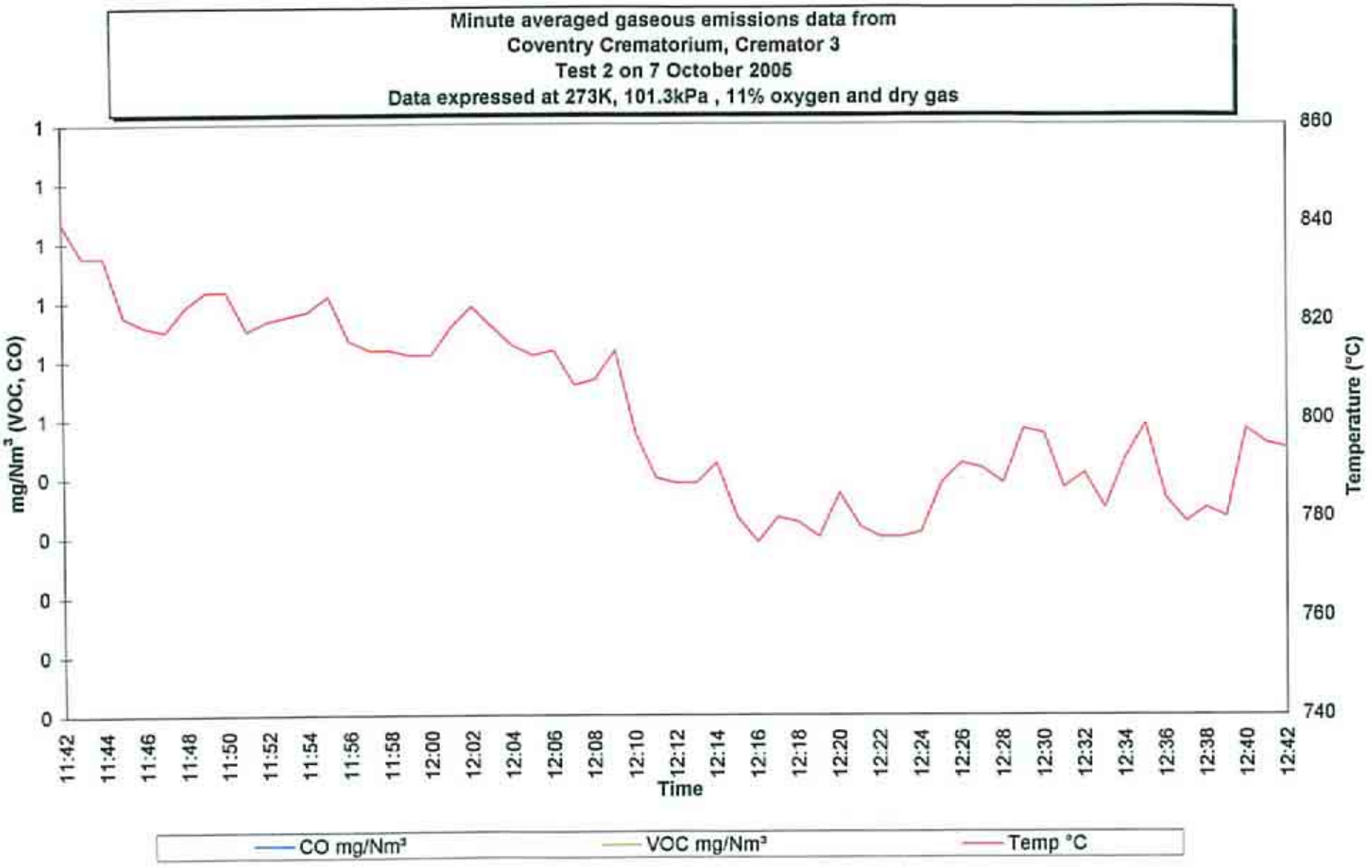
crem 2 tests 1-3 cem CREM 2 TEST 3 PIC

Figure 6



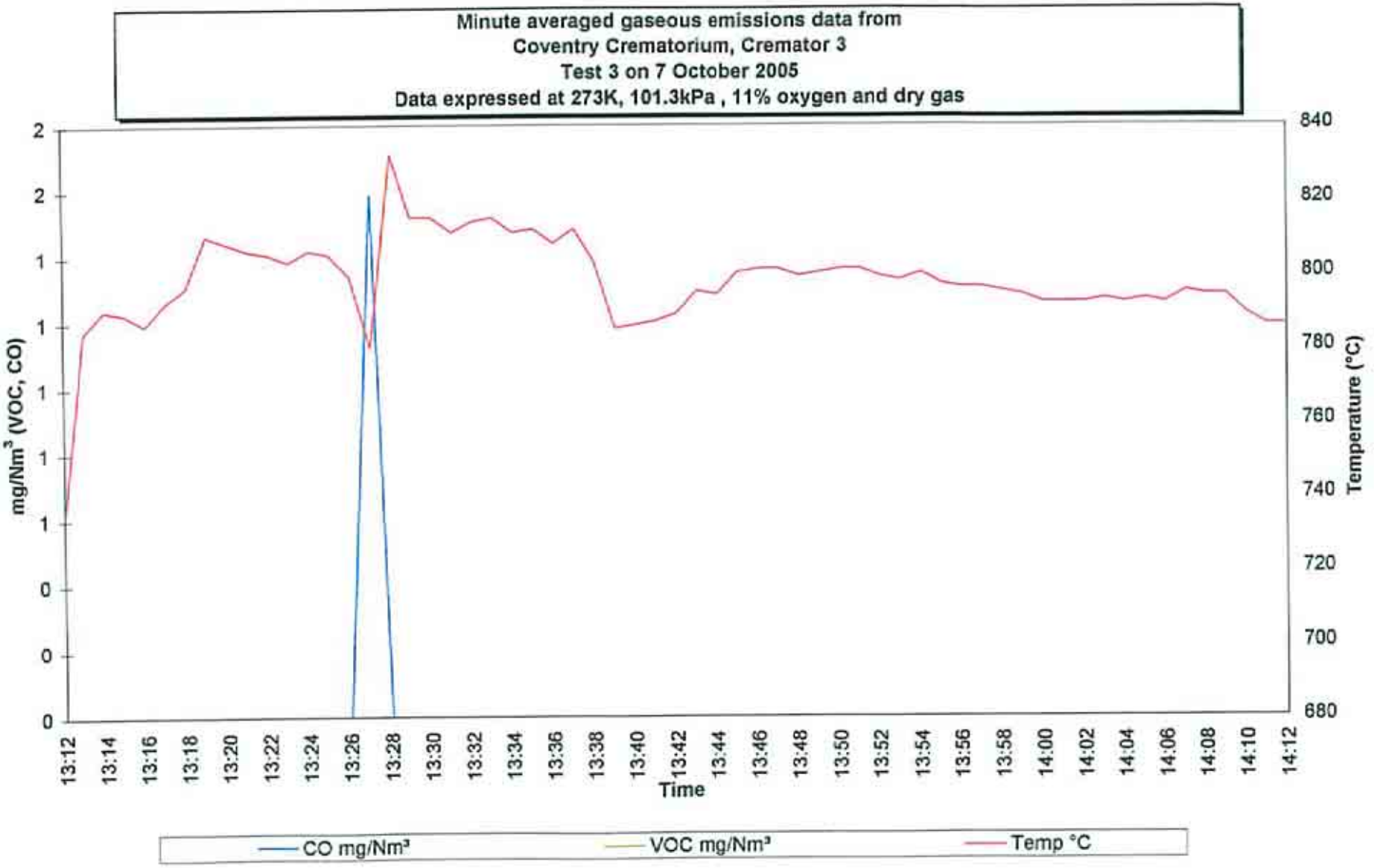
crem 3 tests 1-3 cem CREM 3 TEST 1 PIC

Figure 7



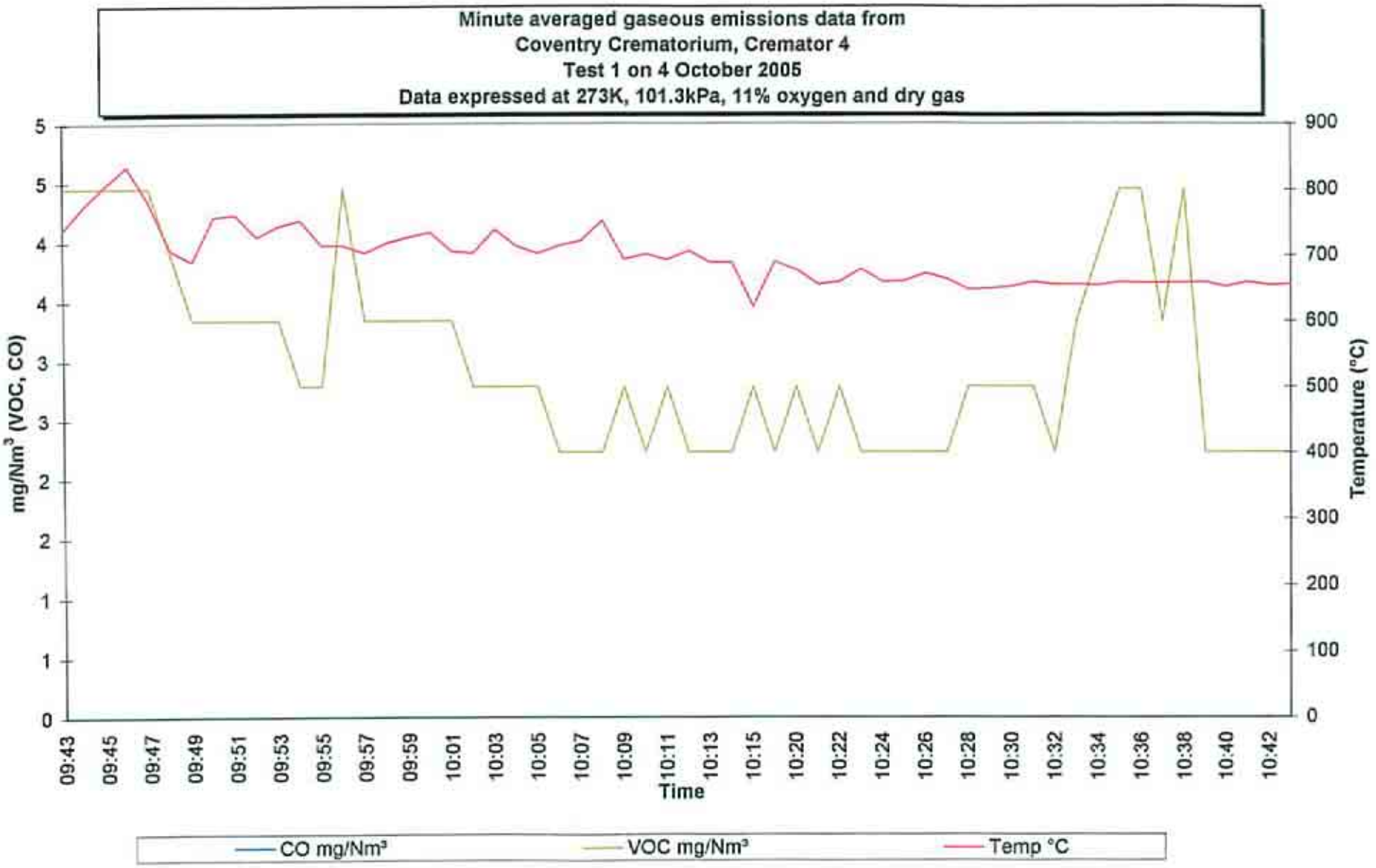
crem 3 tests 1-3 cem CREM 3 TEST 2 PIC

Figure 8



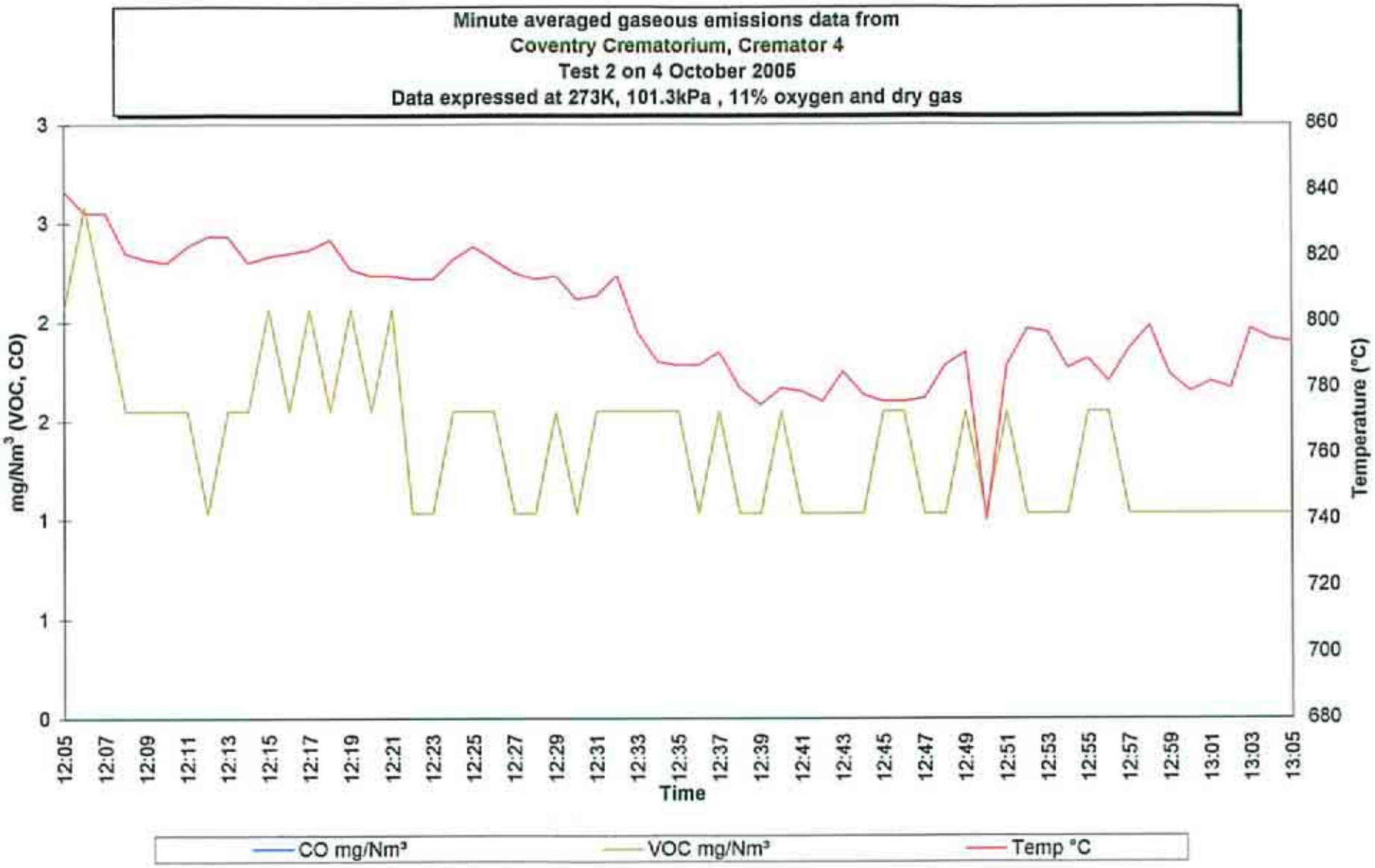
crem 3 tests 1-3 cem CREM 3 TEST 3 PIC

Figure 9



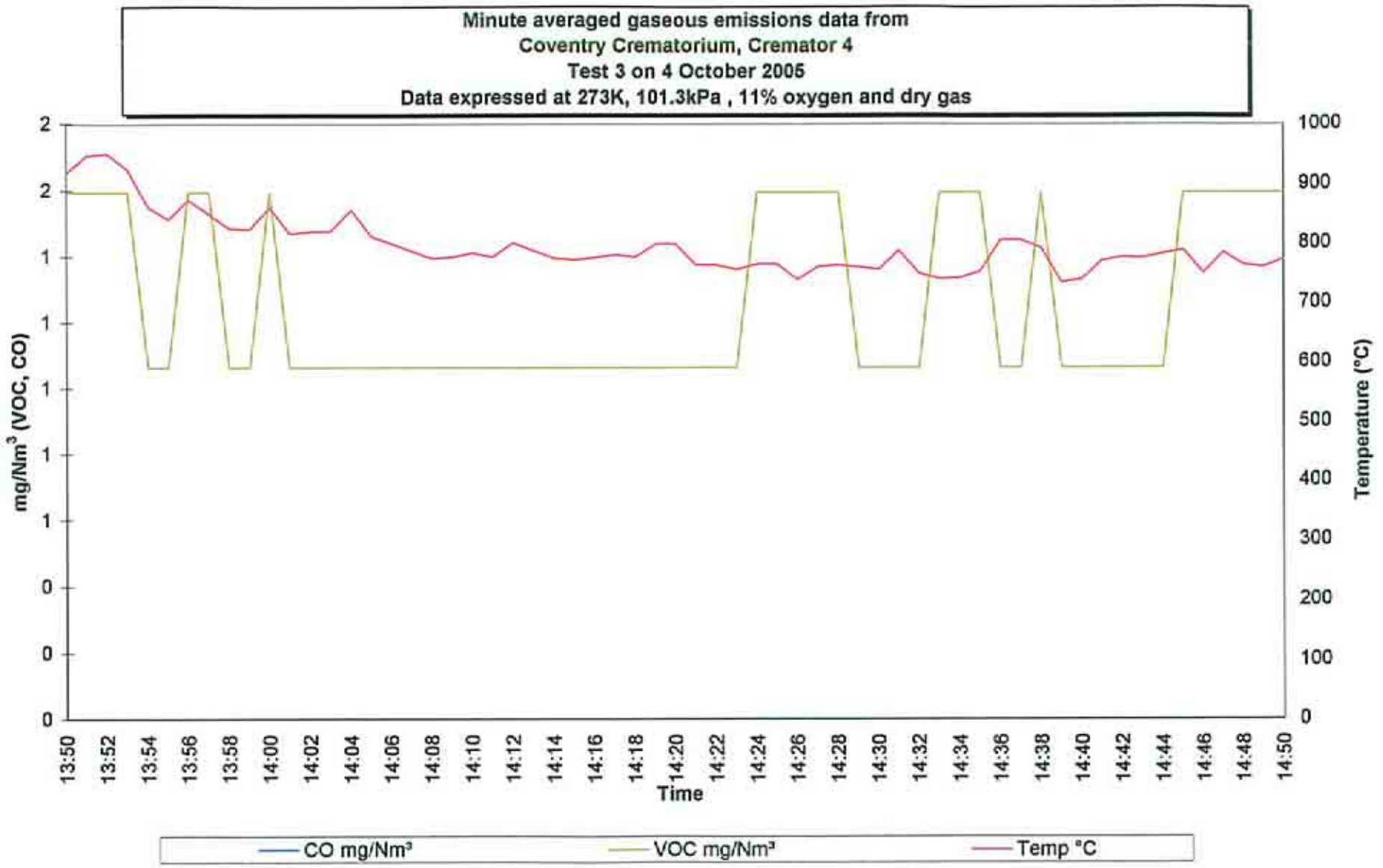
crem 4 tests 1-3 cem CREM 4 TEST 1 PIC

Figure 10



crem 4 tests 1-3 cem CREM 4 TEST 2 PIC

Figure 11



crem 4 tests 1-3 cem CREM 4 TEST 3 PIC

Figure 12

TABLES

Table 1

Flue Gas parameters at Coventry Crematorium
Cremator 1
(Data expressed at 273K, 101.3kPa , 11% O_2 and Dry Gas)

Date	Start Time hr:min	End Time hr:min	Test No	Gas Flow rate m^3/hr	Average Temp °C
06-Oct-05	10:25	11:25	Crem 1 Test 1	858	725
06-Oct-05	12:40	13:40	Crem 1 Test 2	866	743
06-Oct-05	14:20	15:20	Crem 1 Test 3	1088	802

Level of Particulates at Coventry Crematorium, Cremator 1
(Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas)

Test No	Date	Test Start Time	Test End Time	Duration of Sampling	Stack Gas Velocity	Stack Gas Flow at Ref. Cond.	Average Stack Gas Temp.	Stack Gas Oxygen	Stack gas Moisture	Meter Gas Volume at Ref. Conditions	Average Gas Meter Temperature
		hr:min		hr:min	m/s	m^3/s	(°C)	(%)	(%)	(m^3)	(°C)
Crem 1 Test 1	06-Oct-05	10:25	11:25	01:00	8.2	0.24	725	11.5	11.4	0.5856	20.2
Crem 1 Test 2	06-Oct-05	12:40	13:40	01:00	9.0	0.24	743	11.9	13.3	0.5066	22.3
Crem 1 Test 3	06-Oct-05	14:20	15:20	01:00	11.4	0.30	802	11.7	10.7	0.6947	19.3

Test No	Dust Concentration		Accuracy of Results (± 10%)			Mass Emission Rate	Total Particulate Mass Collected	Pre Filter Wt	Post Filter Wt	Particulate on Filter	n.d (*)	Particulate in Acetone
	mg/Nm^3		mg/Nm^3			kg/hr	g	g	g	g		g
Crem 1 Test 1	77		*69.0*	*to*	*84.3*	0.07	0.0449	0.6062	0.6208	0.0146		0.0303
Crem 1 Test 2	141		*126.5*	*to*	*154.6*	0.12	0.0712	0.6527	0.6938	0.0409		0.0303
Crem 1 Test 3	120		*108.4*	*to*	*132.5*	0.13	0.0837	0.6170	0.6704	0.0534		0.0303

* Values Quoted represent the lower analytical limit of detection.

Table 3

Level of Chloride at Coventry Crematorium
on 6 October 2005, Cremator 1
(Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas)
Concentrations of acids in mg/Nm³

Test No	Crem 1 Test 1	Crem 1 Test 2	Crem 1 Test 3		Crem 1 Test 1	Crem 1 Test 2	Crem 1 Test 3
Start Time	10:25	12:40	14:20	Average Mass Emission	Amount of Species in Sample	Amount of Species in Sample	Amount of Species in Sample
End Time	11:25	13:40	15:20	g/hr	mg	mg	mg
Hydrogen Chloride	49.8	111.4	54.2	66	29.19	56.42	37.67

Gas Volume at Ref. Conditions (m³)	0.59	0.51	0.69
Average Gas Meter Temperature (°C)	20.2	22.3	19.3
Oxygen (%)	11.5	11.9	11.7
Moisture (%)	11.4	13.3	10.7

* Values Reported Represent the Lower Analytical Detection Limit.

Table 4

Minute averaged gaseous emissions data from Coventry Crematorium, Cremator 1 Test 1 on 6 October 2005 Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
10:29	0	0	771
10:30	2	0	759
10:31	3	0	770
10:32	2	0	772
10:33	3	0	762
10:34	3	0	766
10:35	3	0	762
10:36	3	0	773
10:37	2	0	740
10:38	3	0	734
10:39	2	0	740
10:40	2	0	744
10:41	2	0	745
10:42	2	0	749
10:43	2	0	709
10:44	3	0	706
10:45	3	0	703
10:46	2	0	706
10:47	3	0	702
10:48	3	0	701
10:49	3	0	699
10:50	3	0	687
10:51	3	0	687
10:52	3	0	686
10:53	3	0	686
10:54	3	0	728
10:55	3	0	736
10:56	3	0	752
10:57	3	0	686
10:58	3	0	691
10:59	3	0	682
11:00	3	0	688
11:01	2	0	677
11:02	2	0	703
11:03	2	0	746
11:04	3	0	688
11:05	2	0	683
11:06	2	0	646
11:07	2	0	732
11:08	2	0	754
11:09	2	0	752
11:10	2	0	711
11:11	2	0	688
11:12	3	0	744
11:13	2	0	751
11:14	3	0	702
11:15	2	0	744
11:16	2	0	749
11:17	2	0	687
11:18	2	0	746
11:19	2	0	747
11:20	2	0	738
11:21	2	0	700
11:22	2	0	701
11:23	2	0	700
11:24	2	0	703
11:25	2	0	700
11:26	2	0	701
11:27	2	0	702
Maximum	3	<1	773
Minimum	<1	<1	646
Average	2	<1	722

Table 5

Minute averaged gaseous emissions data from
Coventry Crematorium, Cremator 1
Test 2 on 6 October 2005
Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
12:44	2	0	783
12:45	3	0	782
12:46	3	0	788
12:47	3	0	783
12:48	2	0	781
12:49	3	0	782
12:50	2	0	792
12:51	3	0	789
12:52	2	0	799
12:53	2	0	792
12:54	3	0	779
12:55	2	0	772
12:56	2	0	760
12:57	3	0	764
12:58	2	0	760
12:59	2	0	775
13:00	2	0	731
13:01	2	0	730
13:02	3	0	730
13:03	2	0	718
13:04	2	0	716
13:05	2	0	717
13:06	2	0	713
13:07	2	0	713
13:08	2	0	708
13:09	2	0	716
13:10	3	0	708
13:11	3	0	710
13:12	2	0	708
13:13	2	0	709
13:14	2	0	703
13:15	2	0	708
13:16	2	0	710
13:17	3	0	712
13:18	2	0	697
13:19	1	0	688
13:20	1	0	698
13:21	2	0	699
13:22	2	0	690
13:23	2	0	700
13:24	2	0	700
13:25	2	0	748
13:26	2	0	699
13:27	2	0	740
13:28	2	0	684
13:29	2	0	682
13:30	2	0	682
13:31	2	0	729
13:32	3	0	751
13:33	3	0	
Maximum	3	<1	799
Minimum	1	<1	682
Average	2	<1	733

Table 6

Minute averaged gaseous omissions data from
Coventry Crematorium, Cremator 1
Test 3 on 6 October 2005
Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
14:22	2	0	818
14:23	2	0	810
14:24	3	0	806
14:25	3	0	801
14:26	3	0	813
14:27	4	0	814
14:28	4	0	820
14:29	3	0	820
14:30	4	0	823
14:31	3	0	830
14:32	4	0	831
14:33	3	0	829
14:34	4	0	789
14:35	3	0	820
14:36	4	0	800
14:37	3	0	842
14:38	3	0	836
14:39	3	0	850
14:40	3	0	827
14:41	2	13	817
14:42	3	1	854
14:43	3	1	845
14:44	2	0	837
14:45	3	0	823
14:46	2	0	808
14:47	3	0	804
14:48	3	0	893
14:49	3	0	831
14:50	3	0	819
14:51	2	0	808
14:52	3	0	804
14:53	3	5	893
14:54	3	0	831
14:55	2	0	827
14:56	2	0	799
14:57	3	0	801
14:58	3	0	789
14:59	3	0	788
15:00	3	0	787
15:01	3	0	798
15:02	3	0	766
15:03	4	0	772
15:04	3	0	774
15:05	3	0	765
15:06	3	0	762
15:07	3	0	759
15:08	3	0	699
15:09	3	0	718
15:10	3	0	734
15:11	3	0	746
15:12	3	0	751
15:13	3	0	741
15:14	4	0	716
15:15	3	0	719
15:16	3	0	710
15:17	3	0	709
15:18	3	0	710
15:19	3	0	704
15:20	3	0	717
Maximum	4	13	893
Minimum	2	<1	699
Average	3	<1	793

Table 7

Flue Gas parameters at Coventry Crematorium
Cremator 2
(Data expressed at 273K, 101.3kPa , 11% O_2 and Dry Gas)

Date	Start Time hr:min	End Time hr:min	Test No	Gas Flow rate m^3/hr	Average Temp °C
05-Oct-05	11:00	12:00	Crem 2 Test 1	1154	793
05-Oct-05	13:00	14:00	Crem 2 Test 2	1111	805
05-Oct-05	15:10	16:10	Crem 2 Test 3	996	794

Level of Particulates at Coventry Crematorium, Cremator 2
(Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas)

Test No	Date	Test Start Time	Test End Time	Duration of Sampling	Stack Gas Velocity	Stack Gas Flow at Ref. Cond.	Average Stack Gas Temp.	Stack Gas Oxygen	Stack gas Moisture	Meter Gas Volume at Ref. Conditions	Average Gas Meter Temperature
		hr:min		hr:min	m/s	m^3/s	(°C)	(%)	(%)	(m^3)	(°C)
Crem 2 Test 1	05-Oct-05	11:00	12:00	01:00	8.6	0.32	793	10.7	13.2	0.5855	20.1
Crem 2 Test 2	05-Oct-05	13:00	14:00	01:00	6.8	0.31	805	8.7	10.5	0.6020	22.6
Crem 2 Test 3	05-Oct-05	15:10	16:10	01:00	6.7	0.28	794	9.7	11.8	0.4869	21.3

Test No	Dust Concentration		Accuracy of Results (± 10%)		Mass Emission Rate	Total Particulate Mass Collected	Pre Filter Wt	Post Filter Wt	Particulate on Filter	n.d (*)	Particulate in Acetone
	mg/Nm^3		mg/Nm^3		kg/hr	g	g	g	g		g
Crem 2 Test 1	32		*28.4*	*to* *34.8*	0.04	0.0185	0.5311	0.5354	0.0043		0.0142
Crem 2 Test 2	48		*43.5*	*to* *53.1*	0.05	0.0291	0.6195	0.6364	0.0169		0.0122
Crem 2 Test 3	132		*119.0*	*to* *145.5*	0.13	0.0644	0.5587	0.5748	0.0161		0.0483

* Values Quoted represent the lower analytical limit of detection.

Table 9

Level of Chloride at Coventry Crematorium
on 5 October 2005, Cremator 2
(Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas)
Concentrations of acids in mg/Nm³

Test No	Crem 2 Test 1	Crem 2 Test 2	Crem 2 Test 3		Crem 2 Test 1	Crem 2 Test 2	Crem 2 Test 3
Start Time	11:00	13:00	15:10	Average Mass Emission	Amount of Species in Sample	Amount of Species in Sample	Amount of Species in Sample
End Time	12:00	14:00	16:10	g/hr	mg	mg	mg
Hydrogen Chloride	21.6	22.6	26.8	26	12.66	13.59	13.06

Gas Volume at Ref. Conditions (m³)	0.59	0.60	0.49
Average Gas Meter Temperature (°C)	20.1	22.6	21.3
Oxygen (%)	10.7	8.7	9.7
Moisture (%)	13.2	10.5	11.8

*** Values Reported Represent the Lower Analytical Detection Limit.**

Table 10

Minute averaged gaseous emissions data from Coventry Crematorium, Cremator 2 Test 1 on 6 October 2005 Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
11:04	2	0	807
11:05	2	5	850
11:06	2	7	830
11:07	2	1	778
11:08	2	1	772
11:09	2	1	771
11:10	2	0	754
11:11	2	0	790
11:12	2	0	786
11:13	1	0	740
11:14	1	0	740
11:15	1	0	713
11:16	2	0	705
11:17	2	0	715
11:18	2	0	718
11:19	2	0	718
11:20	2	0	730
11:21	2	0	784
11:22	4	0	801
11:23	2	0	801
11:24	2	0	819
11:25	1	1	723
11:26	2	0	694
11:27	1	0	663
11:28	2	0	670
11:29	2	0	726
11:30	2	2	880
11:31	1	0	751
11:32	2	1	794
11:33	1	1	700
11:34	2	0	707
11:35	1	0	717
11:36	1	0	819
11:40	1	0	819
11:41	1	0	819
11:42	1	0	827
11:43	1	0	820
11:44	1	0	796
11:45	1	0	756
11:46	1	1	817
11:47	1	1	801
11:48	1	1	790
11:49	2	1	822
11:50	1	1	831
11:51	1	1	833
11:52	1	1	839
11:53	1	1	822
11:54	1	0	829
11:55	1	0	794
11:56	1	0	837
11:57	1	1	805
11:58	2	0	809
11:59	5	1	808
12:00	1	0	817
Maximum	5	7	880
Minimum	<1	<1	663
Average	2	1	778

Table 11

Minute averaged gaseous emissions data from
Coventry Crematorium, Cremator 2
Test 2 on 6 October 2005
Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
13:06	1	3	868
13:07	1	12	863
13:08	1	5	850
13:09	1	3	850
13:10	1	2	839
13:11	1	15	841
13:12	1	7	798
13:13	0	16	850
13:14	1	11	854
13:15	1	5	869
13:16	1	2	865
13:17	1	2	861
13:18	1	7	824
13:19	1	6	823
13:20	1	4	851
13:21	1	20	860
13:22	1	13	863
13:23	1	4	830
13:24	1	4	840
13:25	0	3	839
13:26	1	2	862
13:27	2	8	824
13:28	2	10	835
13:29	0	2	852
13:30	1	1	853
13:31	0	1	784
13:32	0	1	780
13:33	0	1	770
13:34	0	0	822
13:35	0	0	843
13:36	0	1	845
13:37	0	17	756
13:38	1	2	759
13:39	0	1	758
13:40	0	1	827
13:41	0	1	829
13:42	0	0	849
13:43	1	1	875
13:44	0	1	859
13:45	0	1	850
13:46	0	11	856
13:47	0	1	857
13:48	0	1	850
13:49	0	1	835
13:50	0	1	836
13:51	0	0	776
13:52	0	0	845
13:53	0	0	842
13:54	0	0	843
13:55	0	0	835
13:56	0	1	832
13:57	0	1	829
13:58	0	2	835
Maximum	2	20	875
Minimum	<1	<1	756
Average	1	4	835

Minute averaged gaseous emissions data from
Coventry Crematorium, Cremator 2
Test 3 on 6 October 2005
Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
15:13	3	0	839
15:14	3	0	812
15:15	3	0	814
15:16	3	0	812
15:17	3	1	829
15:18	3	1	827
15:19	3	2	821
15:20	3	0	835
15:21	3	0	847
15:22	3	0	848
15:23	3	0	805
15:24	3	0	803
15:25	3	0	797
15:26	3	0	805
15:27	3	0	799
15:28	3	0	836
15:29	3	0	839
15:30	3	0	797
15:31	3	0	800
15:32	3	0	781
15:33	3	0	786
15:34	3	0	794
15:35	3	0	820
15:36	3	1	814
15:37	3	0	814
15:38	3	0	799
15:39	3	0	778
15:40	3	0	778
15:41	3	0	800
15:42	3	1	808
15:43	3	0	822
15:44	3	0	804
15:45	3	0	812
15:46	3	1	780
15:47	3	0	792
15:48	3	0	788
15:49	3	0	809
15:50	3	0	808
15:51	3	0	770
15:52	3	0	776
15:53	3	0	770
15:54	3	0	775
15:55	3	1	788
15:56	3	0	770
15:57	3	0	787
15:58	3	0	772
15:59	3	0	773
16:00	3	0	774
16:01	3	0	781
16:02	3	0	768
16:03	3	0	767
16:04	3	0	768
16:05	3	0	771
16:06	3	0	775
16:07	3	0	777
16:08	3	0	789
16:09	3	0	793
16:10	3	0	786
Maximum	3	2	848
Minimum	3	<1	767
Average	3	<1	798

Flue Gas parameters at Coventry Crematorium
Cremator 3
(Data expressed at 273K, 101.3kPa , 11% O_2 and Dry Gas)

Date	Start Time hr:min	End Time hr:min	Test No	Gas Flow rate m^3/hr	Average Temp °C
07-Oct-05	09:05	10:05	Crem 3 Test 1	947	786
07-Oct-05	11:27	12:27	Crem 3 Test 2	557	810
07-Oct-05	13:07	14:07	Crem 3 Test 3	687	801

Level of Particulates at Coventry Crematorium, Cremator 3
(Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas)

Test No	Date	Test Start Time	Test End Time	Duration of Sampling	Stack Gas Velocity	Stack Gas Flow at Ref. Cond.	Average Stack Gas Temp.	Stack Gas Oxygen	Stack gas Moisture	Meter Gas Volume at Ref. Conditions	Average Gas Meter Temperature
		hr:min		hr:min	m/s	m^3/s	(°C)	(%)	(%)	(m^3)	(°C)
Crem 3 Test 1	07-Oct-05	09:05	10:05	01:00	9.2	0.26	786	11.1	13.4	0.6087	20.5
Crem 3 Test 2	07-Oct-05	11:27	12:27	01:00	9.0	0.15	810	15.0	9.2	0.3565	21.2
Crem 3 Test 3	07-Oct-05	13:07	14:07	01:00	8.6	0.19	801	13.1	12.3	0.4432	22.1

Test No	Dust Concentration		Accuracy of Results (± 10%)			Mass Emission Rate	Total Particulate Mass Collected	Pre Filter Wt	Post Filter Wt	Particulate on Filter	n.d (*)	Particulate in Acetone
	mg/Nm³		mg/Nm³			kg/hr	g	g	g	g		g
Crem 3 Test 1	53		*47.4*	*to*	*57.9*	0.05	0.0320	0.5784	0.5862	0.0078		0.0242
Crem 3 Test 2	122		*109.7*	*to*	*134.0*	0.07	0.0434	0.5945	0.6137	0.0192		0.0242
Crem 3 Test 3	114		*102.4*	*to*	*125.2*	0.08	0.0504	0.6148	0.6410	0.0262		0.0242

* Values Quoted represent the lower analytical limit of detection.

Table 15

Level of Chloride at Coventry Crematorium
on 7 October 2005, Cremator 3
(Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas)
Concentrations of acids in mg/Nm³

Test No	Crem 3 Test 1	Crem 3 Test 2	Crem 3 Test 3		Crem 3 Test 1	Crem 3 Test 2	Crem 3 Test 3
Start Time	09:05	11:27	13:07	Average Mass Emission	Amount of Species in Sample	Amount of Species in Sample	Amount of Species in Sample
End Time	10:05	12:27	14:07	g/hr	mg	mg	mg
Hydrogen Chloride	33.2	85.8	109.5	51	20.20	30.59	48.52

Gas Volume at Ref. Conditions (m³)	0.61	0.36	0.44
Average Gas Meter Temperature (°C)	20.5	21.2	22.1
Oxygen (%)	11.1	15.0	13.1
Moisture (%)	13.4	9.2	12.3

*** Values Reported Represent the Lower Analytical Detection Limit.**

Minute averaged gaseous emissions data from Coventry Crematorium, Cremator 3 Test 1 on 7 October 2005 Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
9:08	1	1	806
9:09	1	0	808
9:10	1	0	815
9:11	1	0	812
9:12	1	0	808
9:13	0	0	771
9:14	0	1	784
9:15	0	0	822
9:16	0	0	795
9:17	0	0	824
9:18	0	0	834
9:19	0	0	830
9:20	0	0	832
9:21	0	0	799
9:22	0	0	845
9:23	0	0	822
9:24	0	0	820
9:25	0	0	804
9:26	0	0	798
9:27	0	0	826
9:28	1	0	832
9:29	1	0	836
9:30	1	0	838
9:31	1	0	816
9:32	0	0	808
9:33	0	0	759
9:34	0	0	756
9:35	0	0	769
9:36	0	0	787
9:37	0	0	817
9:38	0	0	787
9:39	0	0	772
9:40	0	0	764
9:44	0	0	745
9:45	0	0	744
9:46	0	0	749
9:47	0	0	754
9:48	0	0	759
9:49	0	0	825
9:50	0	0	827
9:51	0	0	775
9:52	0	0	751
9:53	0	0	787
9:54	0	0	824
9:55	0	0	797
9:56	0	0	806
9:57	0	0	800
9:58	0	0	783
9:59	0	0	837
10:00	0	0	806
10:01	0	0	804
10:02	0	0	801
10:03	0	0	796
10:04	0	0	795
10:05	0	0	794
Maximum	1	1	845
Minimum	0	0	744
Average	0	0	799

Minute averaged gaseous emissions data from
Coventry Crematorium, Cremator 3
Test 2 on 7 October 2005
Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
11:42	0	0	840
11:43	0	0	833
11:44	0	0	833
11:45	0	0	821
11:46	0	0	819
11:47	0	0	818
11:48	0	0	823
11:49	0	0	826
11:50	0	0	826
11:51	0	0	818
11:52	0	0	820
11:53	0	0	821
11:54	0	0	822
11:55	0	0	825
11:56	0	0	816
11:57	0	0	814
11:58	0	0	814
11:59	0	0	813
12:00	0	0	813
12:01	0	0	819
12:02	0	0	823
12:03	0	0	819
12:04	0	0	815
12:05	0	0	813
12:06	0	0	814
12:07	0	0	807
12:08	0	0	808
12:09	0	0	814
12:10	0	0	797
12:11	0	0	788
12:12	0	0	787
12:13	0	0	787
12:14	0	0	791
12:15	0	0	780
12:16	0	0	775
12:17	0	0	780
12:18	0	0	779
12:19	0	0	776
12:20	0	0	785
12:21	0	0	778
12:22	0	0	776
12:23	0	0	776
12:24	0	0	777
12:25	0	0	787
12:26	0	0	791
12:27	0	0	790
12:28	0	0	787
12:29	0	0	798
12:30	0	0	797
12:31	0	0	786
12:32	0	0	789
12:33	0	0	782
12:34	0	0	792
12:35	0	0	799
12:36	0	0	784
12:37	0	0	779
12:38	0	0	782
12:39	0	0	780
12:40	0	0	798
12:41	0	0	795
12:42	0	0	794
Maximum	0	0	840
Minimum	0	0	775
Average	0	0	801

Minute averaged gaseous emissions data from
Coventry Crematorium, Cremator 3
Test 3 on 7 October 2005
Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
13:12	0	0	734
13:13	0	0	784
13:14	0	0	790
13:15	0	0	789
13:16	0	0	786
13:17	0	0	792
13:18	0	0	796
13:19	0	0	810
13:20	0	0	808
13:21	0	0	806
13:22	0	0	805
13:23	0	0	803
13:24	0	0	806
13:25	0	0	805
13:26	0	0	799
13:27	0	2	780
13:28	0	0	832
13:29	0	0	815
13:30	0	0	815
13:31	0	0	811
13:32	0	0	814
13:33	0	0	815
13:34	0	0	811
13:35	0	0	812
13:36	0	0	808
13:37	0	0	812
13:38	0	0	803
13:39	0	0	785
13:40	0	0	786
13:41	0	0	787
13:42	0	0	789
13:43	0	0	795
13:44	0	0	794
13:45	0	0	800
13:46	0	0	801
13:47	0	0	801
13:48	0	0	799
13:49	0	0	800
13:50	0	0	801
13:51	0	0	801
13:52	0	0	799
13:53	0	0	798
13:54	0	0	800
13:55	0	0	797
13:56	0	0	796
13:57	0	0	796
13:58	0	0	795
13:59	0	0	794
14:00	0	0	792
14:01	0	0	792
14:02	0	0	792
14:03	0	0	793
14:04	0	0	792
14:05	0	0	793
14:06	0	0	792
14:07	0	0	795
14:08	0	0	794
14:09	0	0	794
14:10	0	0	789
14:11	0	0	786
14:12	0	0	786
Maximum	<1	2	832
Minimum	<1	<1	734
Average	<1	<1	797

Table 19

Flue Gas parameters at Coventry Crematorium
Cremator 4
(Data expressed at 273K, 101.3kPa , 11% O_2 and Dry Gas)

Date	Start Time hr:min	End Time hr:min	Test No	Gas Flow rate m^3/hr	Average Temp °C
04-Oct-05	09:41	10:41	Crem 4 Test 1	739	708
04-Oct-05	12:01	13:01	Crem 4 Test 2	655	784
04-Oct-05	13:50	14:50	Crem 4 Test 3	657	817

Level of Particulates at Coventry Crematorium, Cremator 4
(Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas)

Test No	Date	Test Start Time	Test End Time	Duration of Sampling	Stack Gas Velocity	Stack Gas Flow at Ref. Cond.	Average Stack Gas Temp.	Stack Gas Oxygen	Stack gas Moisture	Meter Gas Volume at Ref. Conditions	Average Gas Meter Temperature
		hr:min		hr:min	m/s	m^3/s	(°C)	(%)	(%)	(m^3)	(°C)
Crem 4 Test 1	04-Oct-05	09:41	10:41	01:00	6.5	0.21	708	10.0	13.5	0.5042	17.3
Crem 4 Test 2	04-Oct-05	12:01	13:01	01:00	5.7	0.18	784	9.5	10.8	0.4370	20.8
Crem 4 Test 3	04-Oct-05	13:50	14:50	01:00	6.1	0.18	817	9.8	11.0	0.4724	21.3

Test No	Dust Concentration		Accuracy of Results (± 10%)		Mass Emission Rate	Total Particulate Mass Collected	Pre Filter Wt	Post Filter Wt	Particulate on Filter	n.d (*)	Particulate in Acetone
	mg/Nm^3		mg/Nm^3		kg/hr	g	g	g	g		g
Crem 4 Test 1	25		*22.8*	*to* *27.9*	0.02	0.0128	0.6305	0.6432	0.0127		0.0001
Crem 4 Test 2	66		*59.7*	*to* *73.0*	0.04	0.0290	0.5939	0.6114	0.0175		0.0115
Crem 4 Test 3	110		*99.1*	*to* *121.1*	0.07	0.0520	0.5714	0.5728	0.0014		0.0506

* Values Quoted represent the lower analytical limit of detection.

Table 21

Level of Chloride at Coventry Crematorium
on 4 October 2005, Cremator 4
(Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas)
Concentrations of acids in mg/Nm³

Test No	Crem 4 Test 1	Crem 4 Test 2	Crem 4 Test 3		Crem 4 Test 1	Crem 4 Test 2	Crem 4 Test 3
Start Time	09:41	12:01	13:50	Average Mass Emission	Amount of Species in Sample	Amount of Species in Sample	Amount of Species in Sample
End Time	10:41	13:01	14:50	g/hr	mg	mg	mg
Hydrogen Chloride	17.6	39.9	38.9	22	8.89	17.44	18.38

Gas Volume at Ref. Conditions (m³)	0.50	0.44	0.47
Average Gas Meter Temperature (°C)	17.3	20.8	21.3
Oxygen (%)	10.0	9.5	9.8
Moisture (%)	13.5	10.8	11.0

*** Values Reported Represent the Lower Analytical Detection Limit.**

Table 22

Minute averaged gaseous emissions data from Coventry Crematorium, Cremator 4 Test 1 on 4 October 2005 Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
9:43	4	0	739
9:44	4	0	776
9:45	4	0	807
9:46	4	0	836
9:47	4	0	781
9:48	4	0	708
9:49	3	0	690
9:50	3	0	758
9:51	3	0	762
9:52	3	0	728
9:53	3	0	744
9:54	3	0	753
9:55	3	0	715
9:56	4	0	715
9:57	3	0	704
9:58	3	0	719
9:59	3	0	728
10:00	3	0	735
10:01	3	0	706
10:02	3	0	704
10:03	3	0	739
10:04	3	0	714
10:05	3	0	703
10:06	2	0	715
10:07	2	0	722
10:08	2	0	752
10:09	3	0	694
10:10	2	0	702
10:11	3	0	693
10:12	2	0	707
10:13	2	0	689
10:14	2	0	689
10:15	3	0	622
10:19	2	0	690
10:20	3	0	678
10:21	2	0	656
10:22	3	0	659
10:23	2	0	679
10:24	2	0	659
10:25	2	0	661
10:26	2	0	672
10:27	2	0	664
10:28	3	0	648
10:29	3	0	649
10:30	3	0	652
10:31	3	0	659
10:32	2	0	655
10:33	3	0	656
10:34	4	0	654
10:35	4	0	659
10:36	4	0	658
10:37	3	0	658
10:38	4	0	658
10:39	2	0	659
10:40	2	0	652
10:41	2	0	659
10:42	2	0	654
10:43	2	0	656
Maximum	4	<1	836
Minimum	<1	<1	622
Average	3	<1	697

Minute averaged gaseous emissions data from
Coventry Crematorium, Cremator 4
Test 2 on 4 October 2005
Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
12:05	2	0	840
12:06	3	0	833
12:07	2	0	833
12:08	2	0	821
12:09	2	0	819
12:10	2	0	818
12:11	2	0	823
12:12	1	0	826
12:13	2	0	826
12:14	2	0	818
12:15	2	0	820
12:16	2	0	821
12:17	2	0	822
12:18	2	0	825
12:19	2	0	816
12:20	2	0	814
12:21	2	0	814
12:22	1	0	813
12:23	1	0	813
12:24	2	0	819
12:25	2	0	823
12:26	2	0	819
12:27	1	0	815
12:28	1	0	813
12:29	2	0	814
12:30	1	0	807
12:31	2	0	808
12:32	2	0	814
12:33	2	0	797
12:34	2	0	788
12:35	2	0	787
12:36	1	0	787
12:37	2	0	791
12:38	1	0	780
12:39	1	0	775
12:40	2	0	780
12:41	1	0	779
12:42	1	0	776
12:43	1	0	785
12:44	1	0	778
12:45	2	0	776
12:46	2	0	776
12:47	1	0	777
12:48	1	0	787
12:49	2	0	791
12:50	1	0	740
12:51	2	0	787
12:52	1	0	798
12:53	1	0	797
12:54	1	0	786
12:55	2	0	789
12:56	2	0	782
12:57	1	0	792
12:58	1	0	799
12:59	1	0	784
13:00	1	0	779
13:01	1	0	782
13:02	1	0	780
13:03	1	0	798
13:04	1	0	795
13:05	1	0	794
Maximum	3	<1	840
Minimum	1	<1	740
Average	1	<1	801

Table 24

Minute averaged gaseous emissions data from
Coventry Crematorium, Cremator 4
Test 3 on 4 October 2005
Data expressed at 273K, 101.3kPa, 11% oxygen and dry gas

TIME	VOC mg/Nm³	CO mg/Nm³	Temp °C
13:50	2	0	918
13:51	2	0	948
13:52	2	0	951
13:53	2	0	925
13:54	1	0	861
13:55	1	0	840
13:56	2	0	873
13:57	2	0	849
13:58	1	0	825
13:59	1	0	823
14:00	2	0	860
14:01	1	0	816
14:02	1	0	819
14:03	1	0	820
14:04	1	0	856
14:05	1	0	811
14:06	1	0	799
14:07	1	0	786
14:08	1	0	774
14:09	1	0	777
14:10	1	0	784
14:11	1	0	777
14:12	1	0	801
14:13	1	0	788
14:14	1	0	775
14:15	1	0	772
14:16	1	0	776
14:17	1	0	781
14:18	1	0	777
14:19	1	0	798
14:20	1	0	798
14:21	1	0	763
14:22	1	0	763
14:23	1	0	756
14:24	2	0	765
14:25	2	0	765
14:26	2	0	738
14:27	2	0	761
14:28	2	0	763
14:29	1	0	760
14:30	1	0	756
14:31	1	0	788
14:32	1	0	749
14:33	2	0	740
14:34	2	0	741
14:35	2	0	753
14:36	1	0	805
14:37	1	0	805
14:38	2	0	792
14:39	1	0	733
14:40	1	0	739
14:41	1	0	770
14:42	1	0	777
14:43	1	0	775
14:44	1	0	782
14:45	2	0	789
14:46	2	0	749
14:47	2	0	785
14:48	2	0	764
14:49	2	0	760
14:50	2	0	773
Maximum	2	<1	951
Minimum	1	<1	733
Average	1	<1	795

APPENDIX 1

Site Worksheets

Test no	Crem 1 Test 1		Site: Coventry Crematorium				Stack Description: Cremator 1		
Date	6-10-05		Filter No: AQ10017				Absorber No(s):		
Nozzle diameter	10.00	mm	SITE TEAM: DB, ME						
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:						
			Reference Standard (ISO 9096, BS EN 13284)				Does test conform to standard (Y/N)		
			Type of source		Cremator				
			Plant load						
End volume reading	797.42	m^3		end time	11:25	hr:min	Control Box No:		
Start volume reading	796.80	m^3		start time	10:25	hr:min	AQ003		
Volume sampled	0.62	m^3		total time	01:00	hr:min			

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	11.4	%
CO	0	ppm
CO_2 estimated	8.00	%
N_2	80.50	%
O_2	11.50	%
Dry molecular wt	29.74	
Stack molecular wt	28.40	
Orifice ΔH@ Factor	46.60	mm H_2O
Area of stack	0.13	m^2
Pbar	1013	mbar
Pbar	760.0	mmHg
Pitot tube coeft	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (include dimensions):

LEAK CHECK

Pre Vac (" Hg):	15	Post Vac (" Hg):	1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.00057

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter In Tm(in) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum In Hg	√Δp
1:	10:25	1	10	3.00	15.0	760	-	21	22	131	26	-1.0	1.73
2:	10:35	1	10	1.50	9.0	697	-	21	20	130	33	-1.0	1.22
3:	10:45	1	10	1.50	9.0	695	-	20	20	130	33	-1.0	1.22
4:	10:55	1	10	1.50	9.0	748	-	20	20	130	34	-1.0	1.22
5:	11:05	1	10	1.50	9.0	749	-	19	20	130	35	-1.0	1.22
6:	11:15	1	10	1.50	9.0	698	-	20	19	130	36	-1.0	1.22
7:	11:25												
	Average values		60		10.0	724.5	#DIV/0!		20.2	130.2	32.8	-1.0	1.31

Operational Flow Characteristics at: Test No	Cremator 1 Crem 1 Test 1	Units
Stack Velocity at stack gas T & P and a wet gas basis	8.24	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.24	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	1.04	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	0.92	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.28	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.41	m^3s^{-1}
Gas vol. samp.@ STP and on a dry gas basis	0.62	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.59	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.70	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.66	m^3
Percentage Isokinicity	109	%

Test no	Crem 1 Test 2		Site: Coventry Crematorium			Stack Description: Cremator 1		
Date	6-10-05		Filter No: AQ10018			Absorber No(s):		
Nozzle diameter	10.00	mm	SITE TEAM: DB, ME					
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:					
			Reference Standard (ISO 9096, BS EN 13284)				Does test conform to standard (Y/N)	
			Type of source	Cremator				
			Plant load					
End volume reading	798.03	m^3		end time	13:40	hr:min	Control Box No:	
Start volume reading	797.47	m^3		start time	12:40	hr:min	AQ003	
Volume sampled	0.56	m^3		total time	01:00	hr:min		

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	13.3	%
CO	0	ppm
CO_2 estimated	7.60	%
N_2	80.50	%
O_2	11.90	%
Dry molecular wt	29.69	
Stack molecular wt	28.13	
Orifice ΔH@ Factor	46.60	mm H_20
Area of stack	0.13	m^2
Pbar	1013	mbar
Pbar	760.0	mmHg
Pitot tube coeft	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (Include dimensions):

LEAK CHECK

Pre Vac (" Hg):	15	Post Vac (" Hg):	-1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.00057

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter In Tm(in) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum In Hg	√Δp
1:	12:40	1	10	3.00	15.0	780	-	19	18	132	28	-1.0	1.73
2:	12:50	1	10	3.50	21.0	786	-	26	19	130	32	-1.0	1.87
3:	13:00	1	10	1.50	9.0	794	-	27	21	130	41	-1.0	1.22
4:	13:10	1	10	1.50	9.0	708	-	26	22	130	41	-1.0	1.22
5:	13:20	1	10	1.50	9.0	699	-	23	22	130	40	-1.0	1.22
6:	13:30	1	10	1.50	9.0	689	-	22	22	130	40	-1.0	1.22
	Average values		**60**		**12.0**	**742.7**	**#DIV/0!**		**22.3**	**130.3**	**37.0**	**-1.0**	**1.42**

Operational Flow Characteristics at: Test No	Cremator 1 Crem 1 Test 2	Units
Stack Velocity at stack gas T & P and a wet gas basis	9.04	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.24	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	1.14	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	0.98	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.31	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.42	m^3s^{-1}
Gas vol. samp. @ STP and on a dry gas basis	0.56	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.51	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.64	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.58	m^3
Percentage Isokinicity	94	%

Test no	Crem 1 Test 3		Site: Coventry Crematorium				Stack Description: Cremator 1		
Date	6-10-05		Filter No: AQ10019				Absorber No(s):		
Nozzle diameter	10	mm	SITE TEAM: DB, ME						
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:						
			Reference Standard (BS6069, BS3405, US EPA M5, Non Standard)				Does test conform to standard (Y/N)		
			Type of source						
			Plant load						
End volume reading	798.86	m^3		end time	15:20	hr:min	Control Box No:		
Start volume reading	798.12	m^3		start time	14:20	hr:min	AQ003		
Volume sampled	0.75	m^3		total time	01:00	hr:min			

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	10.7	%
CO	0	ppm
CO_2 estimated	7.80	%
N_2	80.50	%
O_2	11.7	%
Dry molecular wt	29.72	
Stack molecular wt	28.46	
Orifice ΔH@ Factor	46.60	mm H_2O
Area of stack	0.13	m^2
Pbar	1013	mbar
Pbar	760	mmHg
Pitot tube cooft	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (include dimensions):

LEAK CHECK

Pre Vac (" Hg):	15	Post Vac (" Hg):	1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.000567

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter In Tm(in) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum In Hg	√Δp
1:	14:20	1	10	3.00	18.0	824	-	19	20	131	30	-1.0	1.73
2:	14:30	1	10	3.50	21.0	827	-	19	19	130	31	-1.0	1.87
3:	14:17	1	10	3.50	21.0	822	-	18	19	130	41	-1.0	1.87
4:	14:24	1	10	3.00	18.0	808	-	20	19	130	44	-1.0	1.73
5:	14:34	1	10	3.50	21.0	788	-	21	19	130	44	-1.0	1.87
6:	14:44	1	10	2.00	12.0	744	-	20	19	130	44	-1.0	1.41
7:													
	Average values		60		18.5	802.2	#DIV/0!		19.3	130.2	39.0	-1.0	1.75

Operational Flow Characteristics at: Test No	Cremator 1 Crem 1 Test 3	Units
Stack Velocity at stack gas T & P and a wet gas basis	11.41	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.30	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	1.43	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	1.28	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.36	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.52	m^3s^{-1}
Gas vol. samp. @ STP and on a dry gas basis	0.75	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.69	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.84	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.78	m^3
Percentage Isokinicity	102	%

REC
Moisture Test Form

Test No	Crem 1 Test 1
Date	6-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (in)/(out) deg. C	20
delta H (mm of H_20)	10.0
Filter No (if app)	AQ10017

Site	Coventry Crematorium
Stack	Cremator 1
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	797.42	m^3
Start Volume reading	796.80	m^3
Volume Sampled	0.62	m^3

end time	11:25	hr:min
start time	10:25	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of impingers in (gms)	615.8	591.7	597.6	619.5	840	
Start weight in impingers in (gms)	588.1	581.2	594.4	618.2	823.3	
Weight Gain (g)	27.7	10.5	3.2	1.3	16.7	0

Total Weight Gain (1+2+3+4) (g)	59.4

Gas Volume of water at 0 deg. celcius (l)	73.95
Gas Meter volume at 0 deg. celcius (l)	575.30

Moisture content of Gases (%)	11.4

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m^3) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m^3 of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

moisture content aprrox = wt of water collected (g) x 100

wt of water collected (g) + (m^3 of gas on meter x 1200)

REC
Moisture Test Form

Test No	Crem 1 Test 2
Date	6-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (In)/(out) deg. C	22
delta H (mm of H_20)	12.0
Filter No (If app)	AQ10018

Site	Coventry Crematorium
Stack	Cremator 1
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	798.03	m^3
Start Volume reading	797.47	m^3
Volume Sampled	0.56	m^3

end time	13:40	hr:min
start time	12:40	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of Impingers in (gms)	622.7	595.1	594.3	617.6	857.5	
Start weight in impingers in (gms)	593.3	582.6	590.9	616.1	840	
Weight Gain (g)	29.4	12.5	3.4	1.5	17.5	0

Total Weight Gain (1+2+3+4) (g)	64.3

Gas Volume of water at 0 deg. celcius (l)	80.05
Gas Meter volume at 0 deg. celcius (l)	519.88

Moisture content of Gases (%)	13.3

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m^3) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m^3 of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

moisture content aprrox = wt of water collected (g) x 100

wt of water collected (g) + (m^3 of gas on meter x 1200)

REC
Moisture Test Form

Test No	Crem 1 Test 3
Date	6-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (in)/(out) deg. C	19
delta H (mm of H20)	18.5
Filter No (if app)	AQ10019

Site	Coventry Crematorium
Stack	Cremator 1
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	798.86	m³
Start Volume reading	798.12	m³
Volume Sampled	0.75	m³

end time	15:20	hr:min
start time	14:20	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of impingers in (gms)	610.3	593.1	597.1	617.3	808.1	
Start weight in impingers in (gms)	586.3	579.4	591.4	616.1	785.6	
Weight Gain (g)	24	13.7	5.7	1.2	22.5	0

Total Weight Gain (1+2+3+4) (g)	67.1

Gas Volume of water at 0 deg. celcius (l)	83.54
Gas Meter volume at 0 deg. celcius (l)	697.35

Moisture content of Gases (%) (mean of tests 1 & 2)	10.7

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m³) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m³ of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

moisture content aprrox = wt of water collected (g) x 100

wt of water collected (g) + (m³ of gas on meter x 1200)

Test no	Crem 2 Test 1		Site: Coventry Crematorium				Stack Description: Cremator 2		
Date	5-10-05		Filter No: AQ9832				Absorber No(s):		
Nozzle diameter	10.00	mm	SITE TEAM: DB, ME						
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:						
			Reference Standard (ISO 9096, BS EN 13284)				Does test conform to standard (Y/N)		
			Type of source		Cremator				
			Plant load						
End volume reading	795.82	m^3		end time	12:00	hr:min	Control Box No:		
Start volume reading	795.25	m^3		start time	11:00	hr:min	AQ003		
Volume sampled	0.57	m^3		total time	01:00	hr:min			

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	13.2	%
CO	1	ppm
CO_2 estimated	8.80	%
N_2	80.50	%
O_2	10.70	%
Dry molecular wt	29.84	
Stack molecular wt	28.27	
Orifice ΔH@ Factor	46.60	mm H_2O
Area of stack	0.16	m^2
Pbar	1013	mbar
Pbar	760.0	mmHg
Pitot tube coeft	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (include dimensions):

LEAK CHECK

Pre Vac (" Hg):	15	Post Vac (" Hg):	1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.00057

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter In Tm(in) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum In Hg	√Δp
1:	11:00	1	10	1.50	9.0	880	-	15	16	134	40	-1.0	1.22
2:	11:10	1	10	1.50	9.0	742	-	22	17	130	41	-1.0	1.22
3:	11:20	1	10	1.50	9.0	767	-	21	17	130	42	-1.0	1.22
4:	11:30	1	10	2.00	12.0	708	-	25	20	130	47	-1.0	1.41
5:	11:40	1	10	2.00	12.0	815	-	25	20	130	47	-1.0	1.41
6:	11:50	1	10	2.00	12.0	843	-	22	21	129	37	-1.0	1.41
7:	12:00												
	Average values		60		10.5	792.5	#DIV/0!		20.1	130.5	42.3	-1.0	1.32

Operational Flow Characteristics at: Test No	Cromator 2 Crem 2 Test 1	Units
Stack Velocity at stack gas T & P and a wet gas basis	8.60	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.32	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	1.40	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	1.21	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.36	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.57	m^3s^{-1}
Gas vol. samp. @ STP and on a dry gas basis	0.57	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.59	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.65	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.67	m^3
Percentage Isokinicity	105	%

Test no	Crem 2 Test 2		Site: Coventry Crematorium			Stack Description: Cremator 2		
Date	5-10-05		Filter No: AQ9924			Absorber No(s):		
Nozzle diameter	10.00	mm	SITE TEAM: DB, ME					
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:					
			Reference Standard (ISO 9096, BS EN 13284)			Does test conform to standard (Y/N)		
			Type of source	Cremator				
			Plant load					
End volume reading	796.33	m^3		end time	14:00	hr:min	Control Box No:	
Start volume reading	795.84	m^3		start time	13:00	hr:min	AQ003	
Volume sampled	0.49	m^3		total time	01:00	hr:min		

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	10.5	%
CO	4	ppm
CO_2 estimated	10.80	%
N_2	80.50	%
O_2	8.70	%
Dry molecular wt	30.08	
Stack molecular wt	28.80	
Orifice ΔH@ Factor	46.60	mm H_2O
Area of stack	0.16	m^2
Pbar	1013	mbar
Pbar	760.0	mmHg
Pitot tube coeft	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (include dimensions):

LEAK CHECK

Pre Vac (" Hg):	15	Post Vac (" Hg):	-1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.00057

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter In Tm(In) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum In Hg	√Δp
1:	13:00	1	10	1.50	9.0	692	-	20	20	130	33	-1.0	1.22
2:	13:10	1	10	1.00	6.0	852	-	23	20	130	34	-1.0	1.00
3:	13:20	1	10	1.50	9.0	867	-	25	21	130	40	-1.0	1.22
4:	13:30	1	10	2.00	12.0	836	-	26	22	130	45	-1.0	1.41
5:	13:40	1	10	0.50	3.0	835	-	24	24	130	46	-1.0	0.71
6:	13:50	1	10	0.50	3.0	747	-	23	23	130	39	-1.0	0.71
	Average values		60		7.0	804.8	#DIV/0!		22.6	130.0	39.5	-1.0	1.05

Operational Flow Characteristics at: Test No	Cremator 2 Crem 2 Test 2	Units
Stack Velocity at stack gas T & P and a wet gas basis	6.80	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.31	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	1.10	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	0.99	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.28	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.53	m^3s^{-1}
Gas vol. samp. @ STP and on a dry gas basis	0.49	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.60	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.55	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.67	m^3
Percentage Isokinicity	112	%

Test no	Crem 2 Test 3		Site: Coventry Crematorium			Stack Description: Cremator 2		
Date	5-10-05		Filter No: AQ9975			Absorber No(s):		
Nozzle diameter	10	mm	SITE TEAM: DB, ME					
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:					
			Reference Standard (BS6069, BS3405, US EPA M5, Non Standard)				Does test conform to standard (Y/N)	
			Type of source					
			Plant load					
End volume reading	796.77	m^3		end time	16:10	hr:min	Control Box No:	
Start volume reading	796.34	m^3		start time	15:10	hr:min	AQ003	
Volume sampled	0.43	m^3		total time	01:00	hr:min		

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	11.8	%
CO	0.1	ppm
CO_2 estimated	9.80	%
N_2	80.50	%
O_2	9.7	%
Dry molecular wt	29.96	
Stack molecular wt	28.55	
Orifice ΔH@ Factor	46.60	mm H_2O
Area of stack	0.16	m^2
Pbar	1013	mbar
Pbar	760	mmHg
Pitot tube coeff	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (include dimensions):

LEAK CHECK			
Pre Vac (" Hg):	15	Post Vac (" Hg):	1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.000567

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter In Tm(in) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum In Hg	√Δp
1:	15:10	1	10	1.50	9.0	834	-	21	20	124	33	-1.0	1.22
2:	15:20	1	10	1.00	6.0	806	-	23	21	130	33	-1.0	1.00
3:	14:17	1	10	0.50	3.0	780	-	22	21	129	35	-1.0	0.71
4:	14:24	1	10	1.00	6.0	785	-	22	21	129	36	-1.0	1.00
5:	14:34	1	10	1.00	6.0	788	-	22	21	130	38	-1.0	1.00
6:	14:44	1	10	1.50	9.0	769	-	21	21	130	38	-1.0	1.22
7:													
	Average values		60		6.5	793.7	#DIV/0!		21.3	128.7	35.5	-1.0	1.03

Operational Flow Characteristics at: Test No	Cremator 2 Crem 2 Test 3	Units
Stack Velocity at stack gas T & P and a wet gas basis	6.66	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.28	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	1.08	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	0.96	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.28	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.48	m^3s^{-1}
Gas vol. samp. @ STP and on a dry gas basis	0.43	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.49	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.49	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.55	m^3
Percentage Isokinicity	101	%

REC
Moisture Test Form

Test No	Crem 2 Test 1
Date	5-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (In)/(out) deg. C	20
delta H (mm of H_20)	10.5
Filter No (If app)	AQ9832

Site	Coventry Crematorium
Stack	Cremator 2
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	795.82	m^3
Start Volume reading	795.25	m^3
Volume Sampled	0.57	m^3

end time	12:00	hr:min
start time	11:00	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of Impingers in (gms)	625.2	591.3	593.3	617.4	819	
Start weight in Impingers in (gms)	587.3	581.3	590.9	617.9	804.1	
Weight Gain (g)	37.9	10	2.4	-0.5	14.9	0

Total Weight Gain (1+2+3+4) (g)	64.7

Gas Volume of water at 0 deg. celcius (l)	80.55
Gas Meter volume at 0 deg. celcius (l)	530.08

Moisture content of Gases (%)	13.2

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m^3) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m^3 of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

$$\text{moisture content aprrox} = \frac{\text{wt of water collected (g)} \times 100}{\text{wt of water collected (g)} + (m^3 \text{ of gas on meter} \times 1200)}$$

REC
Moisture Test Form

Test No	Crem 2 Test 2
Date	5-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (in)/(out) deg. C	23
delta H (mm of H_20)	7.0
Filter No (if app)	AQ9924

Site	Coventry Crematorium
Stack	Cremator 2
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	796.33	m^3
Start Volume reading	795.84	m^3
Volume Sampled	0.49	m^3

end time	14:00	hr:min
start time	13:00	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of impingers in (gms)	614.8	581.2	591.4	616.2	833.7	
Start weight in impingers in (gms)	590	574.6	594.4	616.2	819	
Weight Gain (g)	24.8	6.6	-3	0	14.7	0

Total Weight Gain (1+2+3+4) (g)	43.1

Gas Volume of water at 0 deg. celcius (l)	53.66
Gas Meter volume at 0 deg. celcius (l)	455.73

Moisture content of Gases (%)	10.5

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m^3) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m^3 of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

moisture content aprrox = $\frac{\text{wt of water collected (g)} \times 100}{\text{wt of water collected (g)} + (m^3 \text{ of gas on meter} \times 1200)}$

REC
Moisture Test Form

Test No	Crem 2 Test 3
Date	5-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (in)/(out) deg. C	21
delta H (mm of H20)	6.5
Filter No (if app)	AQ9975

Site	Coventry Crematorium
Stack	Cremator 2
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	796.77	m³
Start Volume reading	796.34	m³
Volume Sampled	0.43	m³

end time	16:10	hr:min
start time	15:10	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of impingers in (gms)	607.6	584.9	594	615.6	816.9	
Start weight in impingers in (gms)	587.2	580.1	593	615.2	800.4	
Weight Gain (g)	20.4	4.8	1	0.4	16.5	0

Total Weight Gain (1+2+3+4) (g)	43.1

Gas Volume of water at 0 deg. celcius (l)	53.66
Gas Meter volume at 0 deg. celcius (l)	401.50

Moisture content of Gases (%) (mean of tests 1 & 2)	11.8

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m³) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m³ of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

$$\text{moisture content aprrox} = \frac{\text{wt of water collected (g)} \times 100}{\text{wt of water collected (g)} + (\text{m}^3 \text{ of gas on meter} \times 1200)}$$

Test no	Crem 3 Test 1		Site: Coventry Crematorium			Stack Description: Cremator 3		
Date	7-10-05		Filter No: AQ10020			Absorber No(s):		
Nozzle diameter	10.00	mm	SITE TEAM: DB, ME					
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:					
			Reference Standard (ISO 9096, BS EN 13284)			Does test conform to standard (Y/N)		
			Type of source	Cremator				
			Plant load					
End volume reading	799.50	m^3		end time	10:05	hr:min	Control Box No:	
Start volume reading	799.88	m^3		start time	09:05	hr:min	AQ003	
Volume sampled	0.62	m^3		total time	01:00	hr:min		

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	13.4	%
CO	0	ppm
CO_2 estimated	8.40	%
N_2	80.50	%
O_2	11.10	%
Dry molecular wt	29.79	
Stack molecular wt	28.21	
Orifice ΔH@ Factor	46.60	mm H_2O
Area of stack	0.13	m^2
Pbar	1013	mbar
Pbar	760.0	mmHg
Pitot tube coeff	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (include dimensions):

LEAK CHECK			
Pre Vac (" Hg):	15	Post Vac (" Hg):	1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.00057

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter In Tm(in) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum in Hg	√Δp
1:	09:05	1	10	2.00	12.0	788	-	22	20	103	27	-1.0	1.41
2:	09:15	1	10	2.50	15.0	808	-	21	20	126	24	-1.0	1.58
3:	09:25	1	10	2.50	15.0	801	-	21	20	131	30	-1.0	1.58
4:	09:35	1	10	1.50	9.0	769	-	20	20	130	32	-1.0	1.22
5:	09:45	1	10	1.50	9.0	750	-	21	20	131	35	-1.0	1.22
6:	09:55	1	10	2.00	12.0	802	-	21	20	130	37	-1.0	1.41
7:	10:05												
	Average values		60		12.0	786.3	#DIV/0!		20.5	125.2	30.8	-1.0	1.41

Operational Flow Characteristics at: Test No	Cremator 3 Crem 3 Test 1	Units
Stack Velocity at stack gas T & P and a wet gas basis	9.15	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.26	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	1.19	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	1.03	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.31	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.46	m^3s^{-1}
Gas vol. samp. @ STP and on a dry gas basis	0.61	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.61	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.71	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.70	m^3
Percentage Isokinicity	106	%

Test no	Crem 3 Test 2		Site: Coventry Crematorium			Stack Description: Cremator 3		
Date	7-10-05		Filter No: AQ10021			Absorber No(s):		
Nozzle diameter	10.00	mm	SITE TEAM: DB, ME					
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:					
			Reference Standard (ISO 9096, BS EN 13284)			Does test conform to standard (Y/N)		
			Type of source	Cremator				
			Plant load					
End volume reading	800.15	m^3		end time	12:27	hr:min	Control Box No:	
Start volume reading	799.55	m^3		start time	11:27	hr:min	AQ003	
Volume sampled	0.60	m^3		total time	01:00	hr:min		

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	9.2	%
CO	0	ppm
CO_2 estimated	4.50	%
N_2	80.50	%
O_2	15.00	%
Dry molecular wt	29.32	
Stack molecular wt	28.27	
Orifice ΔH@ Factor	46.60	mm H_2O
Area of stack	0.13	m^2
Pbar	1013	mbar
Pbar	760.0	mmHg
Pitot tube coeft	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (include dimensions):

LEAK CHECK

Pre Vac (" Hg):	15	Post Vac (" Hg):	-1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.00057

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter In Tm(in) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum in Hg	√Δp
1:	11:27	1	10	2.00	12.0	808	-	21	20	130	28	-1.0	1.41
2:	11:37	1	10	2.00	12.0	823	-	22	21	130	28	-1.0	1.41
3:	11:47	1	10	2.00	12.0	818	-	22	21	130	28	-1.0	1.41
4:	11:57	1	10	2.50	15.0	813	-	22	21	130	32	-1.0	1.58
5:	12:07	1	10	2.00	12.0	807	-	21	20	130	37	-1.0	1.41
6:	12:17	1	10	1.00	6.0	791	-	22	21	130	38	-1.0	1.00
	Average values		60		11.5	810.0	#DIV/0!		21.2	130.0	31.8	-1.0	1.37

Operational Flow Characteristics at: Test No	Cremator 3 Crem 3 Test 2	Units
Stack Velocity at stack gas T & P and a wet gas basis	9.02	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.15	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	1.13	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	1.03	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.29	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.26	m^3s^{-1}
Gas vol. samp. @ STP and on a dry gas basis	0.60	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.36	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.66	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.39	m^3
Percentage Isokinicity	102	%

Test no	Crem 3 Test 3		Site: Coventry Crematorium				Stack Description: Cremator 3	
Date	7-10-05		Filter No: AQ10022				Absorber No(s):	
Nozzle diameter	10	mm	SITE TEAM: DB, ME					
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:					
			Reference Standard (BS6069, BS3405, US EPA M5, Non Standard)				Does test conform to standard (Y/N)	
			Type of source					
			Plant load					
End volume reading	800.72	m^3		end time	14:07	hr:min	Control Box No:	
Start volume reading	800.16	m^3		start time	13:07	hr:min	AQ003	
Volume sampled	0.56	m^3		total time	01:00	hr:min		

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	12.3	%
CO	0	ppm
CO_2 estimated	6.45	%
N_2	80.50	%
O_2	13.05	%
Dry molecular wt	29.55	
Stack molecular wt	28.13	
Orifice ΔH@ Factor	46.60	mm H_2O
Area of stack	0.13	m^2
Pbar	1013	mbar
Pbar	760	mmHg
Pitot tube coeff	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (include dimensions):

LEAK CHECK

Pre Vac (" Hg):	15	Post Vac (" Hg):	1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.000567

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter In Tm(in) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum In Hg	√Δp
1:	13:07	1	10	2.50	15.0		-	22	21	130	37	-1.0	1.58
2:	13:17	1	10	2.00	12.0	784	-	23	21	129	29	-1.0	1.41
3:	14:17	1	10	2.00	12.0	817	-	23	21	124	32	-1.0	1.41
4:	14:24	1	10	1.50	9.0	811	-	23	21	130	35	-1.0	1.22
5:	14:34	1	10	1.50	9.0	802	-	23	22	131	36	-1.0	1.22
6:	14:44	1	10	1.00	6.0	792	-	23	22	129	36	-1.0	1.00
7:													
	Average values		60		10.5	801.2	#DIV/0!		22.1	128.8	34.2	-1.0	1.31

Operational Flow Characteristics at: Test No	Cremator 3 Crem 3 Test 3	Units
Stack Velocity at stack gas T & P and a wet gas basis	8.59	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.19	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	1.08	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	0.95	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.27	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.33	m^3s^{-1}
Gas vol. samp. @ STP and on a dry gas basis	0.56	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.44	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.64	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.51	m^3
Percentage Isokinicity	103	%

REC
Moisture Test Form

Test No	Crem 3 Test 1
Date	7-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (in)/(out) deg. C	21
delta H (mm of H_20)	12.0
Filter No (if app)	AQ10020

Site	Coventry Crematorium
Stack	Cremator 3
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	799.50	m^3
Start Volume reading	798.88	m^3
Volume Sampled	0.62	m^3

end time	10:05	hr:min
start time	09:05	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of impingers in (gms)	631.4	596.5	585.2	618.1	810.9	
Start weight in impingers in (gms)	590.9	582.6	584.9	617.7	795	
Weight Gain (g)	40.5	13.9	0.3	0.4	15.9	0

Total Weight Gain (1+2+3+4) (g)	71

Gas Volume of water at 0 deg. celcius (l)	88.40
Gas Meter volume at 0 deg. celcius (l)	573.64

Moisture content of Gases (%)	13.4

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m^3) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m^3 of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

$$\text{moisture content aprrox} = \frac{\text{wt of water collected (g)} \times 100}{\text{wt of water collected (g)} + (m^3 \text{ of gas on meter} \times 1200)}$$

REC
Moisture Test Form

Test No	Crem 3 Test 2
Date	7-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (In)/(out) deg. C	21
delta H (mm of H_20)	11.5
Filter No (if app)	AQ10021

Site	Coventry Crematorium
Stack	Cremator 3
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	800.15	m^3
Start Volume reading	799.55	m^3
Volume Sampled	0.60	m^3

end time	12:27	hr:min
start time	11:27	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of impingers in (gms)	611.6	592.6	581.5	616.7	822.3	
Start weight in impingers in (gms)	590.3	582.9	579.2	615.8	810.9	
Weight Gain (g)	21.3	9.7	2.3	0.9	11.4	0

Total Weight Gain (1+2+3+4) (g)	45.6

Gas Volume of water at 0 deg. celcius (l)	56.77
Gas Meter volume at 0 deg. celcius (l)	558.00

Moisture content of Gases (%)	9.2

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m^3) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m^3 of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

moisture content aprrox = wt of water collected (g) x 100

wt of water collected (g) + (m^3 of gas on meter x 1200)

REC
Moisture Test Form

Test No	Crem 3 Test 3
Date	7-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (in)/(out) deg. C	22
delta H (mm of H20)	10.5
Filter No (if app)	AQ10022

Site	Coventry Crematorium
Stack	Cremator 3
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	800.72	m³
Start Volume reading	800.16	m³
Volume Sampled	0.56	m³

end time	14:07	hr:min
start time	13:07	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of Impingers in (gms)	616	596.2	582.7	616.3	833.8	
Start weight in Impingers in (gms)	583.8	585.1	579.5	615.6	822.3	
Weight Gain (g)	32.2	11.1	3.2	0.7	11.5	0

Total Weight Gain (1+2+3+4) (g)	58.7

Gas Volume of water at 0 deg. celcius (l)	73.08
Gas Meter volume at 0 deg. celcius (l)	521.40

Moisture content of Gases (%) (mean of tests 1 & 2)	12.3

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m³) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m³ of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

$$\text{moisture content aprrox} = \frac{\text{wt of water collected (g)} \times 100}{\text{wt of water collected (g)} + (\text{m}^3 \text{ of gas on meter} \times 1200)}$$

Test no	Crem 4 Test 1		Site: Coventry Crematorium				Stack Description: Cremator 4	
Date	4-10-05		Filter No: AQ10034				Absorber No(s):	
Nozzle diameter	10.00	mm	SITE TEAM: DB, ME					
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:					
			Reference Standard (ISO 9096, BS EN 13284)				Does test conform to standard (Y/N)	
			Type of source		Cremator			
			Plant load					
End volume reading	794.34	m^3		end time	10:41	hr:min	Control Box No:	
Start volume reading	793.89	m^3		start time	09:41	hr:min	AQ003	
Volume sampled	0.45	m^3		total time	01:00	hr:min		

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	13.5	%
CO	0	ppm
CO_2 estimated	9.50	%
N_2	80.50	%
O_2	10.00	%
Dry molecular wt	29.92	
Stack molecular wt	28.31	
Orifice ΔH@ Factor	46.60	mm H_2O
Area of stack	0.12	m^2
Pbar	1013	mbar
Pbar	760.0	mmHg
Pitot tube coeff	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (include dimensions):

LEAK CHECK			
Pre Vac (" Hg):	15	Post Vac (" Hg):	1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.00057

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter In Tm(in) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum In Hg	√Δp
1:	09:41	1	10	1.50	9.0	706	-	15	15	132	20	-1.0	1.22
2:	09:51	1	10	1.00	6.0	729	-	18	15	131	20	-1.0	1.00
3:	10:01	1	10	1.00	6.0	732	-	19	16	130	20	-1.0	1.00
4:	10:11	1	10	1.00	6.0	705	-	19	16	130	20	-1.0	1.00
5:	10:21	1	10	1.00	6.0	664	-	20	17	130	20	-1.0	1.00
6:	10:31	1	10	1.00	6.0	713	-	21	17	130	20	-1.0	1.00
7:	10:41												
	Average values		60		6.5	708.2	#DIV/0!		17.3	130.5	20.0	-1.0	1.04

Operational Flow Characteristics at: Test No	Cremator 4 Crem 4 Test 1	Units
Stack Velocity at stack gas T & P and a wet gas basis	6.49	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.21	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	0.77	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	0.67	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.22	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.36	m^3s^{-1}
Gas vol. samp. @ STP and on a dry gas basis	0.46	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.50	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.53	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.58	m^3
Percentage Isokinicity	104	%

Test no	Crem 4 Test 2		Site: Coventry Crematorium			Stack Description: Cremator 4		
Date	4-10-05		Filter No: AQ10035			Absorber No(s):		
Nozzle diameter	10.00	mm	SITE TEAM: DB, ME					
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:					
			Reference Standard (ISO 9096, BS EN 13284)				Does test conform to standard (Y/N)	
			Type of source		Cremator			
			Plant load					
End volume reading	794.77	m^3		end time	13:01	hr:min	Control Box No:	
Start volume reading	794.39	m^3		start time	12:01	hr:min	AQ003	
Volume sampled	0.38	m^3		total time	01:00	hr:min		

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	10.8	%
CO	0	ppm
CO_2 estimated	10.00	%
N_2	80.50	%
O_2	9.50	%
Dry molecular wt	29.98	
Stack molecular wt	28.69	
Orifice ΔH@ Factor	46.60	mm H_2O
Area of stack	0.12	m^2
Pbar	1013	mbar
Pbar	760.0	mmHg
Pitot tube coeff	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (include dimensions):

LEAK CHECK

Pre Vac (" Hg):	15	Post Vac (" Hg):	-1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.00057

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter in Tm(in) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum In Hg	√Δp
1:	12:01	1	10	1.50	9.3	857	-	21	19	124	44	-1.0	1.22
2:	12:11	1	10	0.50	3.1	812	-	22	20	128	49	-1.0	0.71
3:	12:21	1	10	0.50	3.1	777	-	22	20	130	53	-1.0	0.71
4:	12:31	1	10	0.50	3.1	769	-	22	20	130	53	-1.0	0.71
5:	12:41	1	10	1.00	6.2	768	-	22	20	131	53	-1.0	1.00
6:	12:51	1	10	1.00	6.2	722	-	22	20	130	54	-1.0	1.00
	Average values		60	0.8	5.2	784.2	#DIV/0!		20.8	128.8	51.0	-1.0	0.89

Operational Flow Characteristics at: Test No	Cremator 4 Crem 4 Test 2	Units
Stack Velocity at stack gas T & P and a wet gas basis	5.74	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.18	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	0.69	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	0.61	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.18	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.31	m^3s^{-1}
Gas vol. samp. @ STP and on a dry gas basis	0.38	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.44	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.43	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.49	m^3
Percentage Isokinicity	101	%

Test no	Crem 4 Test 3		Site: Coventry Crematorium			Stack Description: Cremator 4		
Date	4-10-05		Filter No: AQ10036			Absorber No(s):		
Nozzle diameter	10	mm	SITE TEAM: DB, ME					
Stack Pres (with +/- above barometric if unknown enter zero)		mm H20	COMMENTS:					
			Reference Standard (BS6069, BS3405, US EPA M3, Non Standard)			Does test conform to standard (Y/N)		
			Type of source					
			Plant load					
End volume reading	795.22	m^3		end time	14:50	hr:min	Control Box No:	
Start volume reading	794.80	m^3		start time	13:50	hr:min	AQ003	
Volume sampled	0.42	m^3		total time	01:00	hr:min		

Conditions	Value	Units
Stack pressure	760.00	mm Hg
Gas Meter Calibration Factor Y	1.0720	
Ref oxygen Value	11	%
Moisture content	11.0	%
CO	0	ppm
CO_2 estimated	9.75	%
N_2	80.50	%
O_2	9.75	%
Dry molecular wt	29.95	
Stack molecular wt	28.63	
Orifice ΔH@ Factor	46.60	mm H_2O
Area of stack	0.12	m^2
Pbar	1013	mbar
Pbar	760	mmHg
Pitot tube coeff	0.837	
Reference Temp	273	K
Reference Pressure	760	mmHg

Diagram of Sample Location (include dimensions):

LEAK CHECK

Pre Vac (" Hg):	15	Post Vac (" Hg):	1
Leak rate (m^3):	<0.00057	Leak rate (m^3):	<0.000567

	Time Hr : Min	Probe position	Time at each position min	Δ p mm H_2O	Δ h mm H_2O	stack Temp Ts °C	probe Temp Tp °C	Meter In Tm(in) °C	Meter out Tm(out) °C	Oven Temp °C	Impinger Temp °C	Vacuum in Hg	√Δp
1:	13:50	1	10	1.50	9.0	922	-	21	20	130	46	-1.0	1.22
2:	14:00	1	10	1.50	9.0	849	-	22	21	130	41	-1.0	1.22
3:	14:17	1	10	0.50	3.0	795	-	21	20	130	46	-1.0	0.71
4:	14:24	1	10	0.50	3.0	787	-	22	21	130	49	-1.0	0.71
5:	14:34	1	10	1.00	6.0	776	-	23	21	130	47	-1.0	1.00
6:	14:44	1	10	0.50	3.0	771	-	23	21	130	48	-1.0	0.71
7:													
	Average values		60		5.5	816.7	#DIV/0!		21.3	130.0	46.2	-1.0	0.93

Operational Flow Characteristics at: Test No	Cremator 4 Crem 4 Test 3	Units
Stack Velocity at stack gas T & P and a wet gas basis	6.08	ms^{-1}
Stack flow @ STP, O_2 (ref) and on a dry gas basis	0.18	m^3s^{-1}
Stack flow @ stack gas T & P and on a wet gas basis	0.73	m^3s^{-1}
Stack flow @ stack gas T & P and on a dry gas basis	0.65	m^3s^{-1}
Stack flow @ STP and on a wet gas basis	0.18	m^3s^{-1}
Stack flow @ STP, O_2 (ref) and on a wet gas basis	0.32	m^3s^{-1}
Gas vol. samp. @ STP and on a dry gas basis	0.42	m^3
Gas vol. samp. @ STP, O_2(ref), and on a dry gas basis	0.47	m^3
Gas vol. samp. @ STP and on a wet gas basis	0.47	m^3
Gas vol. samp. @ STP, O_2 (ref) and on a wet gas basis	0.53	m^3
Percentage Isokinicity	109	%

REC
Moisture Test Form

Test No	Crem 4 Test 1
Date	4-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (in)/(out) deg. C	17
delta H (mm of H_20)	6.5
Filter No (if app)	AQ10034

Site	Coventry Crematorium
Stack	Cremator 4
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	794.34	m^3
Start Volume reading	793.89	m^3
Volume Sampled	0.45	m^3

end time	10:41	hr:min
start time	09:41	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of Impingers in (gms)	665.6	640.4	643.6	623	819.6	
Start weight in Impingers in (gms)	635.8	633.6	641.4	622	805.7	
Weight Gain (g)	29.8	6.8	2.2	1	13.9	0

Total Weight Gain (1+2+3+4) (g)	53.7

Gas Volume of water at 0 deg. celcius (l)	66.86
Gas Meter volume at 0 deg. celcius (l)	427.16

Moisture content of Gases (%)	13.5

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m^3) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m^3 of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

moisture content aprrox = wt of water collected (g) x 100

wt of water collected (g) + (m^3 of gas on meter x 1200)

REC
Moisture Test Form

Test No	Crem 4 Test 2
Date	4-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (In)/(out) deg. C	21
delta H (mm of H_20)	5.2
Filter No (if app)	AQ10035

Site	Coventry Crematorium
Stack	Cremator 4
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	794.77	m^3
Start Volume reading	794.39	m^3
Volume Sampled	0.38	m^3

end time	13:01	hr:min
start time	12:01	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of Impingers in (gms)	597.4	584.2	603.1	616.4	837.4	
Start weight in Impingers in (gms)	586.8	580.5	601.1	616.2	819.6	
Weight Gain (g)	10.6	3.7	2	0.2	17.8	0

Total Weight Gain (1+2+3+4) (g)	34.3

Gas Volume of water at 0 deg. celcius (l)	42.70
Gas Meter volume at 0 deg. celcius (l)	353.98

Moisture content of Gases (%)	10.8

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m^3) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m^3 of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

moisture content aprrox = wt of water collected (g) x 100

wt of water collected (g) + (m^3 of gas on meter x 1200)

REC
Moisture Test Form

Test No	Crem 4 Test 3
Date	4-10-05
pbar (mbar)	1013
pbar (mm of Hg):	760
nozzle diameter (mm)	10.00
Temp of Meter (in)/(out) deg. C	21
delta H (mm of H20)	5.5
Filter No (if app)	AQ10036

Site	Coventry Crematorium
Stack	Cremator 4
Site Team:	DB, ME
Data Entered By:	MS

End Volume Reading	795.22	m³
Start Volume reading	794.80	m³
Volume Sampled	0.42	m³

end time	14:50	hr:min
start time	13:50	hr:min
total time	01:00	hr:min

IMPINGER	1	2	3	4	5	6
End Weight of Impingers in (gms)	606.7	584.2	594.8	618.1	849.8	
Start weight in Impingers in (gms)	589	579.7	592.4	616.1	837.4	
Weight Gain (g)	17.7	4.5	2.4	2	12.4	0

Total Weight Gain (1+2+3+4) (g)	39

Gas Volume of water at 0 deg. celcius (l)	48.56
Gas Meter volume at 0 deg. celcius (l)	391.25

Moisture content of Gases (%) (mean of tests 1 & 2)	11.0

NOTES:

at 0 deg. centigrade
Volume (ltrs) of water in gas phase is Vwc= 1.2444 x wt of water collected
Volume of gas sampled by meter (ltrs) dry Vmc= 359.2 x gas meter reading(m³) x (Pbar + delta H/13.6) / (meter temp +273)

moisture content = Vwc/(Vwc+Vmc)

an approximation is: 1 m³ of gas weighs approx 1.2 Kg
35.3 cu ft of gas = 1 cu m

$$\text{moisture content aprrox} = \frac{\text{wt of water collected (g)} \times 100}{\text{wt of water collected (g)} + (\text{m}^3 \text{ of gas on meter} \times 1200)}$$

APPENDIX 2

Laboratory Submission Sheets

CHAIN OF CUSTODY FORM

Job Ref No.: 40599 **REC Contact:** M. Edwards

Date Collected: 03,04,05,06,07 October 2005 **Date Submitted:** 10/10/05

Sample ID	Sample Description	Analysis Required	T/A*	Comments	Initials	Test Location
40599/01	Di waters	Cl^- + Total vol	N	Test 1	I	Furnace number 1
~~/02~~	~~Filter AQ10034~~	~~Partic recovery~~	~~"~~	~~"~~	~~M~~	~~0~~
~~/03~~	~~Acetone~~	~~Partic residue~~	~~"~~	~~"~~	~~D~~	~~6~~
/04	Di waters	Cl^- + Total vol	"	Test 2	G	8
~~/05~~	~~Filter AQ10035~~	~~Partic recovery~~	~~"~~	~~"~~	~~S~~	~~5~~
~~/06~~	~~Acetone~~	~~Partic residue~~	~~"~~	~~"~~	~~D~~	~~1~~
/07	Di waters	Cl^- + Total vol	"	Test 3	S	Furnace number 2
/08	Filter AQ10036	Partic recovery	"	"		
/09	Acetone	Partic residue	"	"		
/10	Filter AQ9832	Partic Recovery	"	Test 1		
/11	Di waters	Cl^- + Total vol	"	"		
/12	Acetone	Partic Residue	"	"		
/13	Filter AQ9924	Partic Recovery	"	Test 2		
/14	Di waters	Cl^- + Total vol	"	"		
/15	Acetone	Partic residue	"	"		
/16	Filter AQ 9975	Partic recovery	"	Test 3		
/17	Di waters	Cl^- + Total vol	"	"		
/18	Acetone	Partic Residue	"	"		

*Note for Turnaround (T/A), N = Normal or A = Accelerated (please specify eg 3 days, asap)

CARRIER DETAILS

Samples Sent to	Carrier (or by hand)	Time	Date	Delivery Details	Initials
SAL	courier				

CHAIN OF CUSTODY FORM

Job Ref No.:

REC Contact: M.Edwards-

Date Collected: 3,4,5,6,7th october 2005

Date Submitted: 10th october 2005

Furnace run 1 (samples 19–25); Furnace no 3 (samples 26–32)

Sample ID	Sample Description	Analysis Required	T/A*	Comments	Initials	Test Location
70899/19	Filter AQ10017	Partic reweigh	N	Test1		
20	DI water	cl⁻ + Total vol	"	"		
21	Filter AQ10018	Partic reweigh	"	Test2		
22	DI water	cl⁻ + Total vol	"	"		
23	Filter AQ10019	Partic reweigh	"	Test3		
24	DI water	cl⁻ + Total vol	"	"		
25	Acetone	Partic residue	"	Test 1,2,3.		
26	Filter AQ10020	Partic reweigh	"	Test 1		
27	DI water	cl⁻ + Total vol	"	"		
28	Filter AQ10021	Partic reweigh	"	Test2		
29	DI water	cl⁻ + Total vol	"	"		
30	Filter AQ10022	Partic reweigh	"	Test3		
31	DI water	cl⁻ + Total vol	"	"		
32	Acetone.	Partic. residue	"	Test 1,2,3.		
33	Acetone.	Partic Residue,	}	Blank.		
34	Filter AQ10033	Partic Reweigh	} "			
~~35~~	~~DI water~~	~~Partic residue~~	~~"~~	~~Blank~~		
35	DI water	cl⁻ + Total vol ~~Partic Res.~~	"	Blank		

*Note for Turnaround (T/A), N = Normal or A = Accelerated (please specify eg 3 days, asap)

CARRIER DETAILS

Samples Sent to	Carrier (or by hand)	Time	Date	Delivery Details	Initials
Sal Ceradrex UK	carrier				

APPENDIX 3

Calculations

Conversion Factors

ppm ® mg/Nm³ (at 273K, 101.3kPa: STP)

CO	X	1.25	
SO_2	X	2.86	
VOC's	X	0.53	(as total Carbon)
NO_X	X	2.05	(as NO_2)

Oxygen Correction to Reference Value

Concentration at (STP) -> Concentration at 273K, 101.3kPa, reference O_2 and Dry Gas, i.e.

Concentration X ((20.9-O_2 ref)/(20.9-O_2 measured)) = Concentration at ref Oxygen state.

Example Calculation

SO_2 concentration at STP	=	170.7 mg/Nm³
Oxygen percentage in gas stream	=	13.8%
Reference Oxygen	=	11%

SO_2 concentration at reference O_2 conditions	=	170.7 ((20.9-11)/(20.9-13.8))
	=	238 mg/Nm³ at 273K, 101.3kPa, 11% O_2 and Dry Gas

Moisture Correction (Wet to Dry)

Concentration of Gas Dry = Concentration of x 100/100-Bws Gas Wet

Concentration of Gas Wet = Concentration of x 100-Bws/100 Gas Dry

Where Bws = moisture content of gas stream in percent (Vol/Vol).

Example

VOC concentration	=	25 mg/Nm³ (Wet)
Moisture Content	=	27.1%
Concentration of VOC	=	25 (100/(100-27.1))

Carbon (C) to Trichloethylene (TCE)

ppm TCE = ppm C x 0.6715

TCE in mg/m^3 = TCE ppm x 5.864 (Mol Wt/22.4)